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OFFICIAL GAZETTE

of the

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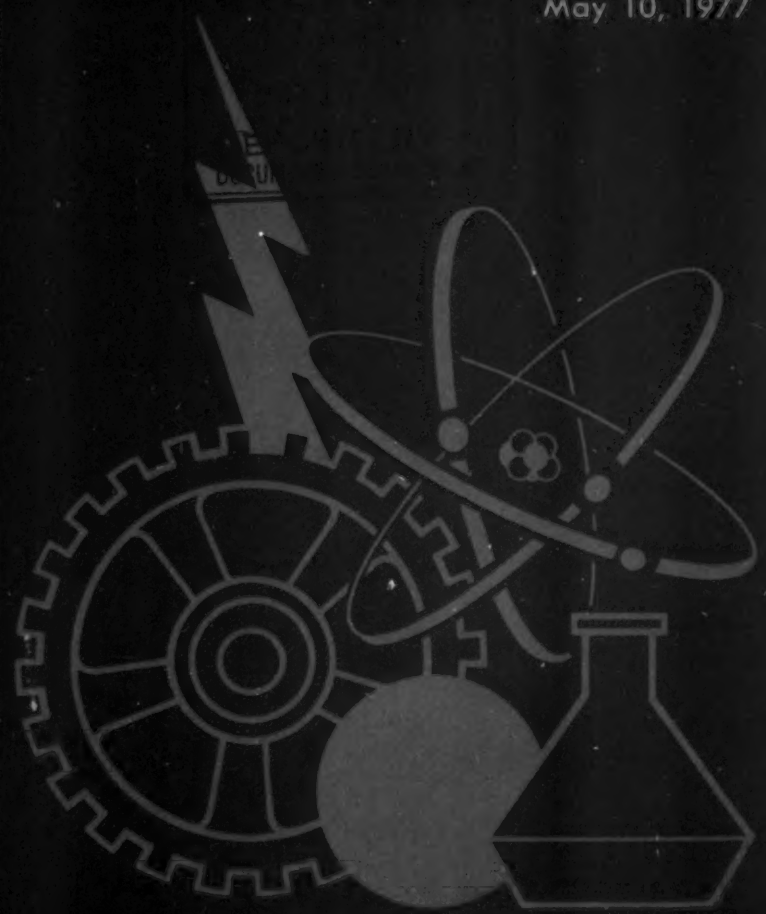
PATENTS

May 10, 1977



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

May 10, 1977 Volume 958 Number 2

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PATENT AND TRADEMARK OFFICE NOTICES

February and March 1977 Classification Orders

The reclassifications covered by the following classification changes became effective during February and March 1977.

	Class	Subclasses
Classification Order 572, effective Feb. 7, 1977:		
Abolished	254	187.
Established	254	187.1–187.8.
Classification Order 573, effective Feb. 11, 1977:		
Established	109	24.1.
Classification Order 574, effective Feb. 15, 1977:		
Abolished	D26	All.
	48	31.
	56	4.
Established	(New) 13	1–41; 99.
	(New) 14	1–96; 99.
	48	33–38.
Classification Order 575, effective Feb. 15, 1977:		
Abolished	307	92–94; 133; 136 and 202.
	317	All.
Established	307	202.1; 326–328.
	(New) 361	1–437.
Classification Order 576, effective Feb. 15, 1976:		
Abolished	D24	All.
	32	All.
	83	All.
	86	All.
	95	All.
Established	2	378.1–378.3
	4	23.1.
	(New) 24	1.1; 2–64; 66; 67; 99
	(New) 28	1–93; 99.
	(New) 29	1–9; 99.
	87	10.
Classification Order 577, effective Feb. 15, 1977:		
Abolished	D8	108–261 and 263–275.
Established	D8	300–404 and 490.
	D87	4.
Title changes	D6	113; 182 and 205.
Classification Order 578, effective March 9, 1977:		
Abolished	152	379; 381.
Established	152	379.1; 379.2; 381.1; 381.2.
Classification Order 579, effective March 16, 1977:		
Abolished	307	235.
Established	307	350–364
Classification Order 580, effective March 22, 1977:		
Abolished	178	Digests 1–45.
Established	358	Cross Reference Art Collection, 901–905.
Title changes	358	43; 44; 49; 50; 52; 243.
Classification Order 581, effective March 28, 1977:		
Abolished	115	.5.
Established	115	71–76 and 900.

NOTE.—In 956 O.G. 1547, March 29, 1977, the reference in Classification Order 566, to the "Established" subclasses in class 206 has been misprinted "55–3600" and should read: 553–600.

ALFRED C. MARMOR,
Administrator for Documentation,
April 13, 1977.

United States Patent and Trademark Office Before the Commissioner of Patents and Trademarks

IN RE JOSEPH W. MOLASKY, RESPONDENT.
PROCEEDINGS FOR SUSPENSION OR DISBARMENT

Order

Joseph W. Molasky of Chalfont, Pennsylvania, whose registration number is 20,951, is hereby suspended for a three-month period beginning May 15, 1977, from practice as a Patent Agent in applications before the United States Patent and Trademark Office, because he knowingly attempted to remove, without proper authorization, property belonging to the Government of the United States from the Public Search Room for Patents of the United States Patent and Trademark Office.

This action is taken under the provisions of 35 U.S.C. section 32 and 37 CFR section 1.348.

Apr. 12, 1977. C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Late Filed Fees for Section 8 Affidavits/Declarations and Notices of Opposition in Trademark Causes

The Commissioner has been receiving a large number of Trademark petitions requesting the acceptance of late-filed fees for Section 8 affidavits or declarations and oppositions. Prior practice has permitted the petitioner merely to assert oversight on his, or a subordinate's, part and the petition has been granted. However, to accept a late-filed fee requires a waiver of a trademark Rule of Practice and Rule 2.148 must be followed in making such a waiver. Rule 2.148 does permit the waiver of a rule that is not a statutory requirement (and these fee rules are not) but three conditions must be met:

1. An extraordinary situation exists;
2. Justice requires the waiver; and
3. No other party will be injured.

Cases and authorities consistently have held that an oversight or omission that could have been prevented by the exercise of ordinary care is not an extraordinary situation—see, for example, *Black's Law Dictionary* (Revised 4th ed. 1951) and *Brady* v. *Baltimore and Ohio R. Co. et al.*, 56 F.2d 231 (N.D. W. Va. 1932), cert. denied, 287 U.S. 610 (1932). Such an oversight is thus one that is not within the purview of Rule 2.148 and one that should not allow relief in these petitions. Several factors, however, are recognized:

1. The standard of Rule 2.148 is arduous and may be too rigid for certain situations like fees; and
2. For some time now, pursuant to *In re Kleiner*, 185 USPQ 362 (Comr. Pat. 1975) in Section 8 fee cases and pursuant to a desire to be consistent with prior unpublished decisions in connection with late opposition fees, the Office has been accepting this naked assertion of oversight as sufficient.

With reference to item 1, we are considering amending the rules to accept late filed opposition fees and Section 8 affidavit fees without the necessity of petitioning the Commissioner nor complying with Rule 2.148. Such a provision might be extended to those few ex parte appeal cases where the papers themselves were timely filed, but the required fee was inadvertently omitted.

We are considering a system where the notice of deficiency now being sent to the party would set a time period in which the required fees could be submitted without petitioning the Commissioner. We are also considering the possibility of an additional fee for this service.

The thinking behind this approach is that fees are ministerial and substantive rights generally should not be denied due to failure to comply with a ministerial function. Thus, it is felt that this proposal will work toward the ends of justice while still supporting the orderly administration of the Office.

With reference to item 2, it is hereby noted that until the rules are amended, or the proposal rejected, the Office will treat petitions concerning late filed fees as they have been to date. Some petitioners have already been informed of this in individual decisions. In other words, *In re Kleiner* is still a viable and citable authority.

Since this approach would directly affect practice before the Office, the Commissioner solicits any views the public may have on any aspect of this proposal. Interested parties are requested to submit their written evaluations to the Assistant Commissioner for Trademarks within sixty days from the date of this notice. Those views will be considered in structuring any proposed rule changes. Naturally, the established procedure (i.e. publication in the Federal Register, etc.) will be followed in processing any such proposed rule change.

It is appropriate to note here that the rules are designed to provide an orderly procedure and parties practicing before this Office, as well as the personnel of this Office, are entitled to rely on their being followed. In situations other than those noted above, deviations from the rules must be justified by circumstances meeting the requirements of Rule 2.148 *in toto*. The Bar is reminded that requests for waivers of the rules must be supported accordingly.

BERNARD A. MEANY,
Assistant Commissioner for Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

3,311,990, LEVEL, Donald E. Wright, **filed** Dec. 30, 1976, D.C.N.J. (Trenton), Doc. C–76–2464, *Empire Level Mfg. Corp. v. Exact Level & Tool Mfg. Co. Inc.*

3,322,296, EASY OPENING CONTAINER, Nick S. Khoury, **filed** Dec. 23, 1976, D.C., E.D. Wis. (Milwaukee), Doc. 76–836, *Continental Group Inc. v. Reynolds Metals Company.*

3,396,342, POWER SUPPLY CIRCUIT FOR CONTINUOUS WAVE MAGNETRON OPERATED BY PULSED DIRECT CURRENT, Albert E. Feinberg, **filed** Jan. 14, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c145, *Advance Transformer Company v. Magic Chef Inc.* **Same, filed** Jan. 4, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c19, *Advance Transformer Co. v. The Tappan Company.* **Same, filed** Apr. 30, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c1026, *Advance Transformer Co. v. Sears Roebuck & Co. and Litton Industries Inc.* Order, patent is good and valid, Sept. 22, 1976.

3,462,876, TOY DUMP TRUCK, Curtis H. Fahrendorff, **filed** Jan. 5, 1977, D.C., S.D.N.Y., Doc. 77–C–47(MP), *Buddy L. Corporation v. Tonka Corporation.*

3,478,986, SPACE DELIVERY SYSTEM, Charles P. Fogarty; **Re. 27,903,** same, **filed** Jan. 10, 1977, D.C. Court of Claims, Doc. 12–77, *Charles P. Fogarty v. The United States of America.*

3,499,302, CYLINDER LOCK, Spain, Oliver, Flora and Powell, **filed** June 26, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c1752, *Medeco Security Locks Inc. v. Lock Technology Corporation.* Stipulation of dismissal, plaintiff's second complaint is hereby dismissed with prejudice. Defendant's counterclaims are hereby dismissed with prejudice, June 29, 1976.

3,667,694, MATERIAL REDUCING HAMMER MILL, Robert M. Williams, **filed** Dec. 28, 1976, D.C., E.D. Mo. (St. Louis), Doc. 76–1202C(A), *Gruendler Crusher & Pulverizer Company v. Williams Patent Crusher & Pulverizer Co. et al.*

3,776,379, LUMBER SORTER, Edward M. Harvey, **filed** Jan. 12, 1977, D.C. Oreg. (Portland), Doc. C–77–32, *U.S. Natural Resources Inc. v. Edward M. Harvey and Harvey Engineering & Manufacturing Corporation.*

3,852,846, DOOR HOLD OPEN ATTACHMENT FOR A DOOR CHECK, Loren E. Slaybough, **filed** Mar. 4, 1976, D.C., W.D.N.C. (Charlotte), Doc. C–C–76–77, *Republic Industries Inc. v. Eaton Corporation.* Stipulation for dismissal, it is hereby stipulated that the complaint and the counterclaims shall be dismissed without prejudice, Jan. 11, 1977.

3,863,034, TRANSLATOR ALARM, Ralph Morrison, **filed** Dec. 20, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–3927–LEW, *Communication Manufacturing Company v. G. L. Collins Corporation.*

3,864,768, WATER MATTRESS WITH INTERNAL FLOAT TUBE, Fraige and Reed, **filed** Jan. 10, 1977, D.C., N.D. Calif. (San Francisco), Doc. C77–68–SC, *Vinyl Products Manufacturing Inc. v. Calco-Hawaiian Import & Export Co., etc. et al.*

3,866,658, PIVOTAL SUPPORT AND GUIDE HARDWARE FOR FOLDING DOORS, Lester L. Smith, **filed** Aug. 15, 1975, D.C., N.D. Ohio (Cleveland), Doc. C75–713, *Lester L. Smith v. Acme General Corporation.* Ordered entered in favor of defendant on both the complaint of infringement and the counterclaim for declaratory judgment, Jan. 10, 1977.

3,890,157, CEMENTITIOUS SYSTEMS INCORPORATING PARTICULATE ADSORBENTS, Henry N. Babcock, **filed** June 18, 1975, D.C., N.D. Ohio (Toledo), Doc. C75–250, *Construction Products Research Inc. v. Sterling Drug Inc.* Plaintiff's complaint is hereby withdrawn in all respects without prejudice. Defendant's counterclaim is hereby withdrawn in all respects with prejudice, Jan. 4, 1977.

3,903,640, CHANGEABLE HAIR DOLL, Kathy A. Dunn, **filed** Jan. 11, 1977, D.C., S.D.N.Y., Doc. 77–C–107, *Marvin Glass and Associates v. Horsman Dolls Inc.*

3,906,311, GRAFT POLYBUTADIENE-STYRENE INTERPOLYMERS AND PROCESS FOR MAKING SAME, Westphal and Heining, **filed** Dec. 7, 1976, D.C., N.D. Tex. (Dallas), Doc. CA3–76–1568, *Foster Grant Co. Inc. v. Coeden Oil & Chemical Company, Southwest Converting Inc., and Crouch Supply Company Inc.*

Re. 27,903. (See 3,478,986.)

3,208,318, QUICK RELEASE FOR SOCKET WRENCHES, Peter M. Roberts, **filed** Dec. 12, 1969, D.C., N.D. Ill. (Chicago), Doc. 69c2573, *Peter M. Roberts v. Sears, Roebuck & Company.* Finding by jury verdict in favor of plaintiff, Jan. 18, 1977.

3,355,696, STAND PIPE STRUCTURE, John Allwood, **filed** Dec. 23, 1976, D.C. Colo. (Denver), Doc. 76–F–1215, *Irrigation & Power Equipment Inc. and A. O. Smith Corporation v. Machinery Specialties.*

3,396,342, POWER SUPPLY CIRCUIT FOR CONTINUOUS WAVE MAGNETRON OPERATED BY PULSED DIRECT CURRENT, Albert E. Feinberg; **3,876,956,** REGULATED POWER SUPPLY CIRCUIT FOR A HEATING MAGNETRON, Melvin L. Levinson, **filed** Jan. 17, 1977, D.C., N.D. Ill. (Chicago), Doc. 77c156, *Advance Transformer Company v. Melvin L. Levinson.*

3,432,793, GROUNDING CONNECTION FOR ELECTRICAL UNIT, Muska, Schacker and McHattie, **filed** Jan. 26, 1977, D.C. Conn. (Bridgeport), Doc. B–77–38, *Muska, Schacker, McHattie and Arrow-Har Inc. v. Westinghouse Electric Corporation.*

3,437,059, DECORATIVE POLE ASSEMBLY, Stonier and James, **filed** July 14, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c1720, *Russ Stonier Inc. v. Allied National Products Inc.* Entered order in accordance with plaintiff's notice of dismissal under Rule 41(a)(1), Oct. 14, 1976.

3,448,698, SALT-SEPARATING UNIT FOR BAKING APPARATUS, Adam M. Namirowski, **filed** Jan. 23, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c196, *A. M. Namirowski v. National Biscuit Company.* Defendant's motion for summary judgment is granted, Sept. 15, 1976.

3,460,631, HIGH CLEARANCE WHEEL MOUNTED SPRING-TOOTH HARROW, Friesen, Klassen, and Kohman, **filed** Oct. 13, 1976, D.C., W.D. Okla. (Oklahoma City), Doc. 76–0823–D, *Hillsboro Industries Inc. v. John's Green Line Inc. and John P. Trindle.*

3,471,011, PROCESS FOR IMPROVING THE BRIGHTNESS OF CLAYS, Iannicelli, Milliman and Stone; **3,627,678,** MAGNETIC SEPARATOR AND MAGNETIC SEPARATION METHOD, Marston, Nolan and Lontai; **3,676,337,** PROCESS FOR MAGNETIC SEPARATION, Henry Kolm, **filed** Jan. 27, 1977, D.C.N.J. (Trenton), Doc. 77–173, *Engelhard Minerals and Chemicals Corporation v. J. M. Huber Corporation.*

3,544,013, SOIL TREATING APPARATUS, Daniel Dorfman, **filed** Jan. 11, 1971, D.C.N.J. (Newark), Doc. 47–71, *Lawn-A-Mat Chemical & Equipment Corporation v. Lawn King Inc.* Order staying this action until Chapter XI proceedings are completed and terminating action administratively, Jan 26, 1977.

3,590,865, FLAT UMBRELLA, Manfred Bremshey, **filed** Jan. 11, 1977, D.C., N.D. Ga. (Atlanta), Doc. 77–47a, *Knirps Canada Ltd. v. Atlanta Umbrella Company Inc.*

3,627,678. (See 3,471,011.)

3,639,792, MOTOR-GENERATOR, Robert F. Anderson, **filed** Jan. 19, 1977, D.C. Minn. (St. Paul), Doc. 2–77–34, *Electro-Craft Corporation v. Tachtronic Instruments Inc.*

3,644,681, CORDLESS TELEPHONE SYSTEM, Dale E. Rice, **filed** July 22, 1974, D.C., S.D. Calif. (San Diego), Doc. 74–356–E, *Bison Enterprises Ltd. v. Howard Gutzmer, doing business as Gutzmer International & Fonetron Inc.* Stipulation and order for dismissal, Jan. 18, 1977.

3,676,337. (See 3,471,011.)

3,696,231. PHOTOCOMPOSITION ERROR CORRECTION SYSTEM, Leonard Storch, **filed** Jan. 8, 1975, D.C. N.D. Ga. (Atlanta), Doc. C75–38a, *Leonard Storch v. Automix Keyboards Inc.* Plaintiff's voluntary dismissal with approval of court was filed Apr. 5, 1976.

3,696,744, SADDLE LOCKUP FOR FLEXIBLE PRINTING PLATE, Gordon Etchell, **filed** Jan. 24, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77–281–AAH, *Beach Manufacturing Corp. v. Rockwell International Corporation.*

3,900,250, SEMI-RIGID GAS PERMEABLE CONTACT LENSES, Edward J. Ivani, **filed** Jan. 25, 1977, D.C., N.D. Ohio (Cleveland), Doc. C77–18, *Rynco Scientific Corporation v. Continuous Curve Contact Lenses Inc.*

3,924,648, METHOD AND MEANS FOR APPLYING ADDITIVES TO INDUSTRIAL GAS, Berwyn E. Etter, **filed** Jan. 26, 1977, D.C., N.D. Ga. (Atlanta), Doc. C77-128a, *O. M. Taylor, James M. McKenna, ESAB Distribution South-East and TMA Inc.* v. *Flamex Distributors Inc.*

3,925,586, STENCIL CASTING PROCESS AND RESULTING ARCHITECTURAL ART, Paul E. Maxwell, **filed** Jan. 24, 1977, D.C., N.D. Tex. (Dallas), Doc. CA3-77-0102G, *Paul E. Maxwell* v. *Elevations/Design Inc., et al.*

3,957,176, DISPOSABLE PUTTY DISPENSER, Lloyd Marston, **filed** Nov. 2, 1976, D.C., N.D. Ohio (Cleveland), Doc. C-76-1158, *Dynatron/Bondo Corp.* v. *Oatey Company.* **Same, filed** Jan. 28, 1977, D.C., S.D. Ohio (Cincinnati), Doc. C-1-77-42, *Dynatron/Bondo Corporation* v. *Fibre Glass-Evercoat.*

3,959,591, TELEPHONE ANSWERING APPARATUS, James R. Darwood, **filed** Dec. 28, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76-4020-RMT, *T.A.D. Avanti Inc.* v. *Phone-Mate Inc.*

D. 220,644, MONEY BOX, L. D. Robinson, **filed** Aug. 18, 1975, D.C., W.D. Okla (Oklahoma City), Doc. C-75-0700, *L. Elsworth Robinson and Leva Delores Robinson, doing business as Cash Caddy Corporation* v. *Continental Plastics of Oklahoma.* Filed and entered consent decree, that plaintiff's patent is good and valid, Dec. 30, 1976.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,071,745, Re. S.N. 779,893, Filed Mar. 21, 1977, Cl. 338/2, PRESSURE SENSITIVE DIAPHRAGMS WITH STRESS NULL ZONE ORIENTED BRIDGE PATTERNS, Cecil K. Stedman, Owner of Record: *Statham Instruments, Incorporated, Los Angeles, Calif.,* Attorney or Agent: William E. Schuyler, Jr., et al., Ex. Gp.: 213

3,725,749, Re. S.N. 775,070, Filed Mar. 7, 1977, Cl. 317/234 R, $GaAs_{1-x}P_x$ ELECTROLUMINESCENT DEVICE DOPED WITH ISOELECTRONIC IMPURITIES, Warren O. Groves, et al., Owner of Record: *Monsanto Company, St. Louis, Mo.,* Attorney or Agent: Peter S. Gilster, Ex. Gp.: 254

3,824,214, Re. S.N. 779,155, Filed Mar. 18, 1977, Cl. 260/52, HALOVINYLIDENE ARYLENE POLYMERS AND PROCESS FOR MAKING THE SAME, Tohru Takekoshi, Owner of Record: *General Electric Company, New York, N.Y.,* Attorney or Agent: William A. Teoli, et al., Ex. Gp.: 143

3,846,046, Re. S.N. 779,387, Filed Mar. 21, 1977, Cl. 417/54, LIQUID RING PUMP LOBE PURGE, Kenneth W. Roe, et al., Owner of Record: *Nash Engineering Company, Norwalk, Conn.,* Attorney or Agent: Albert C. Nolte, Jr., et al., Ex. Gp.: 343

3,855,181, Re. S.N. 779,154, Filed Mar. 18, 1977, Cl. 260/49, ARYL METHYLENE POLYMERS PREPARED FROM CHLORAL, BROMAL OR GLYOXALIC ACID, Tohru Takekoshi, et al., Owner of Record: *General Electric Company, Schenectady, N.Y.,* Attorney or Agent: William A. Teoli, et al., Ex. Gp.: 143

3,872,497, Re. S.N. 779,009, Filed Mar. 18, 1977, Cl. 358/4, SIGNAL TRANSLATING APPARATUS FOR COMPOSITE SIGNAL SUBJECT TO JITTER, John Gordon Amery, et al., Owner of Record: *RCA Corporation, New York, N.Y.,* Attorney or Agent: Eugene M. Whitacre, et al., Ex. Gp.: 233

3,873,047, Re. S.N. 778,053, Filed Mar. 16, 1977, Cl. 241/275, IMPACT CRUSHER, Louis W. Johnson, Owner of Record: *El-Jay, Inc., New York, N.Y.,* Attorney or Agent: Kenneth S. Klarquist, et al., Ex. Gp.: 325

3,891,392, Re. S.N. 778,830, Filed Mar. 17, 1977, Cl. 23/230 R, METHOD OF MAINTAINING A COLUMN OF LIQUID WITHIN AN OPEN-ENDED TUBE, AND A TUBE DEVICE FOR CARRYING OUT THE METHOD, Peter Alan Betts, et al., Owner of Record: *Inventor,* Attorney or Agent: William A. Drucker, Ex. Gp.: 171

3,949,158, Re. S.N. 779,242, Filed Mar. 18, 1977, Cl. 178/5.8, WIDE BAND AFT CIRCUIT FOR TELEVISION RECEIVER, Theodore S. Rzeszewski, et al., Owner of Record: *Quasar Electronics Corporation, Franklin Park, Ill.,* Attorney or Agent: LaValle D. Ptak, et al., Ex. Gp.: 233

3,963,702, Re. S.N. 779,076, Filed Mar. 18, 1977, Cl. 260/239.1, PHTHALIDE PENICILLIN ESTER INTERMEDIATES, Harry Ferres, Owner of Record: *Beecham Group Limited, Brentford, Middlesex, England,* Attorney or Agent: Jacobs & Jacobs, Ex. Gp.: 122

3,967,970, Re. S.N. 778,750, Filed Mar. 14, 1977, Cl. 106/41, CELLULATION METHOD AND PRODUCT, John W. North, Owner of Record: *Inventor,* Attorney or Agent: Edward Taylor Newton, et al., Ex. Gp.: 115

3,976,795, Re. S.N. 778,179, Filed Mar. 16, 1977, Cl. 426/115, FOOD SELF CONTAINED IN A COOKING CONTAINER AND PROCESS FOR MAKING THE SAME, Momofuku Ando, Owner of Record: *Nissen Shokuhin Kaisha, Ltd., Takatsuki, Osaka, Japan,* Attorney or Agent: James E. Armstrong, et al., Ex. Gp.: 177

3,978,166, Re. S.N. 778,329, Filed Mar. 16, 1977, Cl. 260/927 R, CYCLIC PHOSPHONATES, Ingenuin Hechenbleikner, Owner of Record: *Borg-Warner Corporation, Chicago, Ill.,* Attorney or Agent: Alvin Guttag, Ex. Gp.: 127

3,987,791, Re. S.N. 779,455, Filed Mar. 21, 1977, Cl. 128/272.3, ADDITIVE TRANSFER UNIT HAVING A SLIDABLE PIERCING MEMBER, Richard M. Chittenden, et al., Owner of Record: *Abbott Laboratories, North Chicago, Ill.,* Attorney or Agent: Neil E. Hamilton, et al., Ex. Gp.: 335

3,989,468, Re. S.N. 778,541, Filed Mar. 17, 1977, Cl. 23/273 SP, APPARATUS FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS, Wolfgang Keller, Owner of Record: *Siemens Aktiengesellschaft, Berlin and Munich, Germany,* Attorney or Agent: Benjamin H. Sherman, et. al., Ex. Gp.: 175

3,996,096, Re. S.N. 778,587, Filed Mar. 17, 1977, Cl. 156/620, METHOD FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS, Wolfgang Keller, Owner of Record: *Siemens Aktiengesellschaft, Berlin and Munich, Germany,* Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 161

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

PATENT NOTICES

Certificates of Correction for the Week of May 10, 1977

D. 240,558	3,969,389	3,993,258	4,003,516
3,685,297	3,970,766	3,993,646	4,003,746
3,706,030	3,974,062	3,993,968	4,004,316
3,718,604	3,975,535	3,993,987	4,004,628
3,806,781	3,976,033	3,994,867	4,004,700
3,810,745	3,976,971	3,994,890	4,004,783
3,812,644	3,977,461	3,995,218	4,004,947
3,821,942	3,978,337	3,996,185	4,005,039
3,822,303	3,978,507	3,996,450	4,005,169
3,823,098	3,978,509	3,996,505	4,005,440
3,839,674	3,979,095	3,996,564	4,005,862
3,843,544	3,979,205	3,996,572	4,006,133
3,846,345	3,980,177	3,996,658	4,006,296
3,857,914	3,980,570	3,997,708	4,006,579
3,865,544	3,980,859	3,998,021	4,006,700
3,875,917	3,981,387	3,998,568	4,006,824
3,880,570	3,981,620	3,998,642	4,007,375
3,886,293	3,982,759	3,998,668	4,007,808
3,890,543	3,982,985	3,998,858	4,008,462
3,891,382	3,983,112	3,998,864	4,008,734
3,896,740	3,983,290	3,998,973	4,008,759
3,896,989	3,983,360	3,999,154	4,009,026
3,900,112	3,984,624	3,999,177	4,009,337
3,901,648	3,985,179	3,999,673	4,009,625
3,914,090	3,985,340	3,999,686	4,010,067
3,922,471	3,985,375	3,999,843	4,010,087
3,927,901	3,986,603	4,000,079	4,010,261
3,934,228	3,986,943	4,000,239	4,010,542
3,940,547	3,987,037	4,000,356	4,010,676
3,946,112	3,987,859	4,000,409	4,010,763
3,946,533	3,988,216	4,000,638	4,010,905
3,955,259	3,988,256	4,000,923	4,010,910
3,955,577	3,988,375	4,001,230	4,011,003
3,956,218	3,988,824	4,001,318	4,011,430
3,960,729	3,989,127	4,001,700	4,011,453
3,962,350	3,989,281	4,001,886	4,011,468
3,962,897	3,989,452	4,002,235	4,011,541
3,963,898	3,990,098	4,002,293	4,011,640
3,965,338	3,990,308	4,002,459	4,011,915
3,966,256	3,991,199	4,002,544	4,012,084
3,966,378	3,991,562	4,002,759	4,012,261
3,966,560	3,991,743	4,002,837	4,012,331
3,967,134	3,991,761	4,002,965	4,012,497
3,967,444	3,992,219	4,002,981	4,012,631
3,968,354	3,992,554	4,003,049	
3,969,111	3,992,869	4,003,294	

Disclaimers

Design No. 234,367.—*Jon Wolfard*, Albany, Calif. OIL LAMP. Patent dated Feb. 18, 1975. Disclaimer filed Mar. 28, 1977, by the inventor.

Hereby disclaims the entire term of said patent.

3,717,600.—*Albert J. Dalhuisen*, Sunnyvale, *William H. Deis*, Belmont, and *David C. Burgett*, Daly City, Calif. MAGNESIUM OXIDE DISPERSIONS. Patent dated Feb. 20, 1973. Disclaimer filed Mar. 14, 1977, by the assignee, *Merck & Co., Inc.*

Hereby enters this disclaimer to claims 1–47 of said patent.

3,965,316.—*Harry William Olson*, Woodridge, Ill. LOW FORCE SWITCH MECHANISM. Patent dated June 22, 1976. Disclaimer filed Mar. 23, 1977, by the assignee, *McGill Manufacturing Company, Inc.*

Hereby enters this disclaimer to claims 1–4, inclusive, of said patent.

3,976,976.—*Vartan N. Khosharian*, San Diego, Calif. METHOD AND MEANS TO ACCESS AND EXTENDED MEMORY UNIT. Patent dated Aug. 24, 1976. Disclaimer filed Mar. 22, 1977, by the assignee, *The United States of America as represented by the Secretary of the Navy.*

Hereby enters this disclaimer to claim 3 of said patent.

Dedications

3,552,112.—*Leo L. Chabot*, Cumberland, R.I. THREAD FORMING GRIPPER. Patent dated Jan. 5, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,583,141.—*Maurice Poull*, Meyrin, Geneva, Switzerland. RADIALLY CLAMPING GRIPS. Patent dated June 8, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,583,142.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. RADIALLY CLAMPING GRIPS. Patent dated June 8, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,583,143.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. RADIALLY CLAMPING GRIPS. Patent dated June 8, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,583,144.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. FALSE TWISTER HAVING RADIALLY CLAMPING GRIPS. Patent dated June 8, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,584,453.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. RADIALLY CLAMPING GRIPS. Patent dated June 15, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,593,511.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. TWISTING HEAD FOR TEXTILE MACHINE. Patent dated July 20, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,605,396.—*Claude Guignard*, Ferney-Voltaire, France; and *Jean Pellaton*, Chatelaine, and *Maurice Poull*, Meyrin, Switzerland. DEVICE FOR INSERTING FILAMENT INTO A RADIALLY CLAMPING GRIP. Patent dated Sept. 20, 1971. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,664,110.—*Herbert Stalder*, Geneva, and *Jean Pellaton*, Chatelaine, Geneva, Switzerland. SLIDING RADIALLY-CLAMPING GRIPPER. Patent dated May 23, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,665,695.—*Richard A. Amato*, Bolton, Mass. TEXTILE MACHINE. Patent dated May 30, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,670,486.—*George L. Murray, Jr.*, Milford, Mass. ELECTROSTATIC SPINNING HEAD FUNNEL. Patent dated June 20, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,691,744.—*Joseph W. Dubois*, North Smithfield, R.I. YARN PIECING DEVICE. Patent dated Sept. 19, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,699,760.—*Leo L. Chabot*, Cumberland, R.I. OPEN END ELECTROSTATIC SPINNING HEAD. Patent dated Oct. 24, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,699,765.—*Richard A. Amato*, Bolton, Mass. ELECTROSTATIC SPINNING HEAD. Patent dated Oct. 24, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,699,766.—*Roger J. Archambault*, Blackstone, Mass. DRAFTING COT ASSEMBLY. Patent dated Oct. 24, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,706,193.—*Richard A. Amato*, Bolton, Mass. SPINNING HEAD. Patent dated Dec. 19, 1972. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,744,231.—*Lawrence E. Tannas, Jr.*, Orange, and *Paul K. York*, Fullerton, Calif. APPARATUS AND METHOD FOR FREEING DRAFTING ROLLS OF ADHERING FIBERS. Patent dated July 10, 1973. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,772,868.—*Richard A. Amato*, Bolton, Mass. and *Leo L. Chabot*, Cumberland, R.I. FIBER CONVEYING DEVICE FOR AN OPEN-END SPINNING APPARATUS. Patent dated Nov. 20, 1973. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

3,845,611.—*Necdet Senturk*, Norwood, and *Frank A. Aschenbrenner*, Framingham, Mass. METHOD AND APPARATUS FOR PRODUCING COMPOSITE YARN. Patent dated Nov. 5, 1974. Dedication filed Mar. 23, 1977, by the assignee, *Electrospin Corporation*.

Hereby dedicates to the Public the entire term of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF APRIL 9, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-22-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	7-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	8-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-21-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	10-15-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	3-15-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-1-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	10-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	4-27-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-6-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	5-24-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-10-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-15-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-19-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-5-76

Expiration of patents: The patents within the range of numbers indicated below expire during April 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,931,038 to 2,934,765, inclusive
Plant Patents..... Numbers 1,926 to 1,948, inclusive

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,205

PRESS FOR HYDROSTATIC EXTRUSION OF TUBES

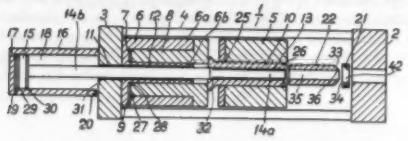
Jan Nilsson, Robertsfors, Sweden, assignor to ASEA AB, Vasteras, Sweden

Original No. 3,841,128, dated Oct. 15, 1974, Ser. No. 367,106, June 5, 1973. Application for reissue Dec. 29, 1975, Ser. No. 644,901

Claims priority, application Sweden, June 12, 1972, 727688

Int. Cl.² B21C *25/04*

U.S. Cl. 72—60 4 Claims



1. Press for hydrostatic extrusion of tubes, comprising a press stand, a pressure chamber constituted by a high-pressure cylinder axially displaceable in the press stand, a die insertable into the cylinder and a pressure-generating punch insertable into the cylinder to generate the pressure necessary for the extrusion process in a pressure medium enclosed in the pressure chamber, said pressure medium surrounding a billet to be extruded, a mandrel part which shapes the hole through the tube, which includes a rod part passing slidably through the pressure-generating punch, said mandrel part being supported by said rod part, a first seal *fixedly arranged at the end of the pressure chamber remote from the die* sealing between the high pressure cylinder and the pressure generating punch and a second seal sealing between the pressure generating punch and the mandrel, said second seal being *carried by said rod and* axially stationary in relation to the first seal during the extrusion period of an operating cycle and approximately in the same radial plane as said first seal.

Re. 29,206

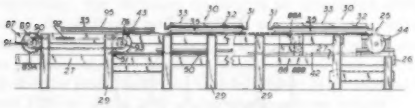
VACUUM PALLET TYPE SCREEN PRINTING MACHINE WITH REGISTRATION MEANS

David Jaffa, Fairlawn, N.J., assignor to Precision Screen Machines Inc., Hawthorne, N.J.

Original No. 3,763,776, dated Oct. 9, 1973, Ser. No. 120,819, Mar. 4, 1971. Application for reissue July 11, 1975, Ser. No. 595,159

Int. Cl.² B41F *15/20*

U.S. Cl. 101—407 R 25 Claims



18. In a screen printing machine having a frame, a screen printing head defining a printing station and mounted on said frame for movement between printing and non-printing positions, pallet means, drive means and means for operatively connecting said pallet means to said drive means to effectuate substantially concomitant movement of said pallet means with said drive means,

said improvement comprising,

means operatively connected with said drive means for indexing said pallet means with respect to said printing station,

means for effecting registration of said pallet means with said printing head after said pallet means have been indexed to said printing station,

said means connecting said pallet means to said drive means includes elastic resilient coupling means,

said resilient coupling means comprising at least one link interconnected between said pallet means and said drive means,

said link comprising a bearing housing connected to said pallet means and an elastic resilient bearing member, and

said resilient bearing member being disposed within said bearing housing and being connected to said drive means.

Re. 29,207

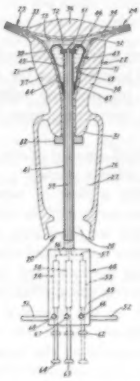
DISPENSING METHOD AND APPARATUS

Lee R. Bolduc, St. Louis Park, and Eugene A. Dickhudt, St. Paul, both of Minn., assignors to Population Research Incorporated, Minneapolis, Minn.

Original No. 3,822,702, dated July 9, 1974, Ser. No. 372,971, June 25, 1973. Application for reissue Jan. 24, 1975, Ser. No. 543,875

Int. Cl.² A61M *1/00*

U.S. Cl. 128—235 42 Claims



14. Apparatus for non-surgically providing materials into the Fallopian tubes of a female body comprising: first means for dispensing material into a uterine cavity; and second means selectively operable within the uterine cavity for moving the dispensed material from the uterine cavity into both Fallopian tubes.

Re. 29,208

METHOD AND APPARATUS FOR MANUFACTURING SYNTHETIC RESIN TUBULAR FILM HAVING OCCLUDENT MEANS IN THE INSIDE SURFACE THEREOF

Kakuji Naito, Tokyo, Japan, assignor to Kabushiki Kaisha Seisan Nihon Sha, Tokyo, Japan

Original No. 3,340,116, dated Sept. 5, 1967, Ser. No. 89,540, Feb. 15, 1961. Application for reissue Sept. 30, 1975, Ser. No. 618,164

Claims priority, application Japan, Apr. 11, 1960, 35-21148; Apr. 11, 1960, 35-21149; June 3, 1960, 35-26770

Int. Cl.² B32B *7/04*

U.S. Cl. 156—91 13 Claims

1. A method of manufacturing a tube to be used for forming synthetic resin bags provided with occludent means comprising.

(a) a step wherein is molded continuously by passing through a mold plastic forming a tubular bag body and

integrally therewith in the inside of said bag body in pairs male and female ribs for occludent use, next,

(b) a step wherein air is delivered into said tubular body and said body is kept under uniform pressure,

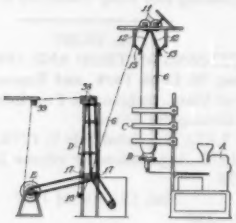
(c) tension is imparted to the tubular film between said mold and delivery rolls provided as clasping means of said tubular body,

(d) cold air is delivered from a zone surrounding said tubular body during its travel to cool the film directly from the outside, and further

(e) a step wherein the male and female ribs are occluded while said tubular bag body is being pressed flat.

3. The method of making a unitary container material which comprises,

(a) extruding a one piece continuous closed tube having continuous axially extending *male and female interlocking*



closure elements integral therewith formed at circumferentially spaced locations on the tube surface and shaped for releasably interlocking with each other with said elements each projecting from one surface only of the tube,

(b) *directing a small amount of air into the tube to maintain the tube in its tubular shape,*

[(b)] (c) *directing a flow of outer cooling air annularly around the outer surface of the tube at a location where the tube has reached its final size and diameter after being extruded and after being filled with the air directed into the tube and* cooling the extruded tube at a rate so that said elements remain on the surface on which they appear and do not project on the opposite surface *and so that the closure elements are cooled retaining their shape and size,* [(c)] (*d*) and separating the tube longitudinally between said elements.

Re. 29,209

METHOD AND APPARATUS FOR CONTINUOUSLY SENSING THE CONDITION F A GAS STREAM

Donald A. Sayles, 767 College Ave., Pittsburgh, Pa. 15232

Original No. 3,869,370, dated Mar. 4, 1975, Ser. No. 357,627, May 7, 1973. Application for reissue Dec. 16, 1975, Ser. No. 641,234

Int. Cl.² G01N *31/00*; B01K *3/00*

U.S. Cl. 204—1 T **5 Claims**

3. A method for continuously sensing the condition of a gas flowing in a main passageway comprising,

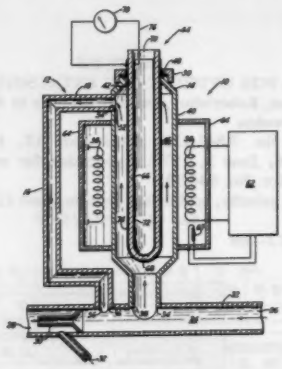
connecting a gas inlet leg of a sample gas flow conduit to an opening in the main passageway,

connecting a gas outlet leg of said sample gas flow conduit to a second opening in said main passageway,

said gas inlet leg and said gas outlet leg arranged in spaced relation to each other and operable to provide a difference in static head therebetween,

positioning a ceramic oxide electrolyte electrochemical cell in one of said legs of said gas flow conduit, and

heating said gas inlet leg and maintaining a temperature differential between said gas inlet leg and said gas outlet leg so that a sample stream of a gas is withdrawn from said gas flowing in said main passageway by convection at a



preselected flow rate and measuring the oxygen partial pressure of said sample stream of gas.

Re. 29,210

SYNTHESIS OF CHALCOGENATED POLYACENES

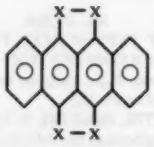
Evelio A. Perez-Albuerne, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Original No. 3,723,417, dated Mar. 27, 1973, Ser. No. 149,056, June 1, 1971. Application for reissue Mar. 1, 1976, Ser. No. 662,382

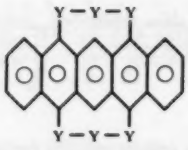
Int. Cl.² C07D *341/00*

U.S. Cl. 260—327 B **8 Claims**

1. In a method for preparing a compound having the formula:



or



wherein X and Y each represent identical atoms selected from the group consisting of sulfur [, selenium, and tellurium,] by a reaction of elemental [chalcogen selected from the group consisting of] sulfur [, selenium, and tellurium] and a polyacene selected from the group consisting of tetracene and pentacene in the presence of a hot solvent, the improvement which comprises employing an alkylated amide as said solvent.

Re. 29,211

ALKOXYSILOXANOLS

Richard Newton Lewis, Tecumseh, Mich., assignor to SWS Silicones Corporation, Adrian, Mich.

Original No. 3,799,962, dated Mar. 26, 1974, Ser. No. 214,406, Dec. 30, 1971. Application for reissue Oct. 24, 1974, Ser. No. 517,722

Int. Cl.² C07F 7/18

U.S. Cl. 260—448.8 R 7 Claims

7. A method for preparing an alpha-alkoxy-omega-siloxanol having the formula $R'O(R_2SiO)_xH$ which comprises reacting *in the absence of a basic catalyst* a cyclic polysiloxane with a primary or secondary alcohol of the formula R'OH in which R is selected from the group consisting of a monovalent hydrocarbon radical, a halogenated monovalent hydrocarbon radical and a cyanoalkyl radical having up to 8 carbon atoms, R' is selected from the group consisting of alkyl radicals, cycloalkyl radicals, alkenyl radicals, aralkyl radicals and substituted derivatives thereof having up to 20 carbon atoms and x is an integer of from 2 to 10 in a mol ratio of alcohol to cyclic polysiloxane of at least 2:1 and at temperatures up to the reflux temperature of the alcohol.

Re. 29,212

PACK DIFFUSION COATING OF METALS

Alfonso L. Baldi, Drexel Hill, Pa., and Victor V. Damiano, Pennsauken, N.J., assignors to Alloy Surfaces Company, Inc., Wilmington, Del.

Original No. 3,867,184, dated Feb. 18, 1975, Ser. No. 328,378, Jan. 31, 1973. Application for reissue Mar. 1, 1976, Ser. No. 662,517

Int. Cl.² C23C 9/00

U.S. Cl. 427—253 6 Claims

1. In the process of diffusion coating a metal article, the improvement according to which a single diffusion coating heat is arranged to coat different portions of the article in different ways by maintaining the different portions in contact with different diffusion coating packs *applies essentially the same coating in predetermined different thicknesses to adjacent portions of the article by packing one portion in a diffusion coating pack containing an inhibitor for the desired coating to inhibit the coating thickness formed on that portion as against the coating thickness formed on a different portion.*

2. The combination of claim 1 in which the metal article is a superalloy, the diffusion coating is an aluminum diffusion coating, the different coating packs are chromium-containing aluminum diffusion packs, one pack contains more chromium than aluminum, and another pack contains less chromium than the one pack, and also contains silicon in an amount from about 10% to about 20% of the aluminum by weight.

4. The combination of claim 3 *6* in which cobalt and chromium are the essential diffusible metal ingredients of both packs, one pack is energized with a chloride energizer to cause diffusion coating of essentially only the chromium and the other with an iodide energizer to cause diffusion coating of more cobalt than chromium.

6. In the process of diffusion coating a metal article, the improvement according to which a single diffusion coating heat applies significantly different coatings to different portions of the article from packs that differ from each other essentially only in the compositions of their energizers.

Re. 29,213

WIRE ENAMEL BASED ON AMIDE-IMIDE HYDANTOIN POLYMERS

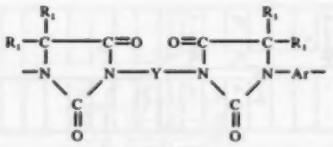
Edmund J. Zalewski, Schenectady, N.Y.; John L. Simonian, Bethune, France, and John T. Keating, Schenectady, N.Y., assignors to Schenectady Chemicals, Inc., Schenectady, N.Y.

Original No. 3,838,088, dated Sept. 24, 1974, Ser. No. 331,077, Feb. 9, 1973. Continuation of Ser. No. 166,594, July 27, 1971, abandoned. Application for reissue May 6, 1975, Ser. No. 565,696

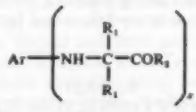
Int. Cl.² C08K 5/01, 5/13; C08L 79/08; H01B 3/30

U.S. Cl. 428—458 25 Claims

1. An amide-imide-hydantoin polymer wherein the recurring hydantoin units are 5 to 95% of the total linkages and the amide groups are 20 to 80% of the total number of the amide and imide groups, the recurring hydantoin units having the formula:



wherein the symbol Ar represents an aromatic hydrocarbon radical or an aromatic hydrocarbon radical carrying a substituent group selected from the class consisting of halo, nitro, alkyl, alkoxy, dialkylamino, acyl, carbalkoxy or cyano; the symbol Y represents *the residue of the reaction product of trimellitic anhydride and a diisocyanate having the formula OCN-Z-NCO where Z represents* a radical as defined for Ar or is an alkylene radical of 4 to 10 carbon atoms, an oxyalkylene radical of 4 to 10 carbon atoms or a thioalkylene radical of 4 to 10 carbon atoms; the symbol R_1 represents hydrogen or an alkyl radical, and wherein the said hydantoin units are formed by reacting (A) a glycine derivative of the formula



wherein R_2 is a dialkylamino, alkoxy or aryloxy radical and x is an integer from 2 to 4,

with (B) a preformed amide-imide prepolymer having terminal isocyanate groups, said prepolymer having been prepared by reacting (1) trimellitic anhydride or (2) a mixture of trimellitic anhydride with a dicarboxylic acid or carboxylic acid dianhydride or tricarboxylic acid with (a) a diisocyanate, or (b) a diisocyanate and up to about 15 equivalent percent of an organic titanate.

Re. 29,214

PREASSMBLED ELECTRICAL WIRING APPARATUS AND METHOD OF INSTALLATIN THEREOF

Robert L. Schultz, 5597 Green Highway, Tecumseh, Mich. 49286

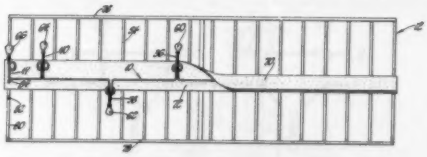
Original No. 3,792,190, dated Feb. 12, 1974, Ser. No. 307,273, Nov. 16, 1972. Application for reissue Feb. 10, 1975, Ser. No. 548,523

Int. Cl.² H02G 3/02, 1/00; B65D 85/00

U.S. Cl. 174—72 R 13 Claims

1. Electrical wiring apparatus for use in [establishing electrical connections between each of a plurality of electrical terminal devices to be disposed in predetermined locations in] *wiring* a building structure comprising: a wiring harness including a main trunk cable of a developed length substantially equal to said structure to be wired and a plurality of branch

cables having one end electrically [connected to] *joining with* said trunk cable at spaced locations along the length thereof; [said spaced locations to be determined in accordance with the longitudinal spacings between terminal device locations within said structure;] each of said branch cables having an individual electrical terminal device electrically connected to the other end thereof; [the length of said branch cables being equal to the sum of the horizontal distance from said trunk cable to one side of said structure and the vertical distance between the trunk cable and the standard vertical location of the particular terminal device;] first package means disposed about individual terminal devices and at least a portion of the branch cables connected thereto; and second package means disposed about the entire harness including said trunk and branch cables and electrical terminal devices. [and being of such length and width as to permit said harness to be rolled up therein from one end to the other.]



12. A method [as defined in claim 11] *of installing electrical wiring* including the [further] steps of: *preparing an electrical wiring harness comprising a main trunk cable and a plurality of branch cable portions electrically integral therewith and having individual electrical terminal devices secured thereto, packaging each of said terminal devices individually along with a portion of the branch cable secured thereto, further packaging the entire harness in an outer package, subsequently placing the outer package and harness on a building module, extending the trunk cable along the module,* [placing the rolled envelope and wiring harness on a building module, unrolling the roll, opening the envelope] and extending the branch cable portions outwardly from the trunk cable and securing the branch cable [portion] *portions* to the building [structure] *module* at predetermined locations.

Re. 29,215

CROSS-OFFICE CONNECTING SCHEME FOR INTERCONNECTING MULTIPLEXERS AND CENTRAL OFFICE TERMINALS

Adam Carroll Carney, Middletown; Michael Peter Cichetti, Jr., New Monmouth; Joseph George Kneuer, Fair Haven, and Donald Wesley Rice, Wanamassa, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original No. 3,794,768, dated Feb. 26, 1974, Ser. No. 256,827, May 25, 1972. Application for reissue Apr. 26, 1976, Ser. No. 680,065

Int. Cl.² H04J *3/06*

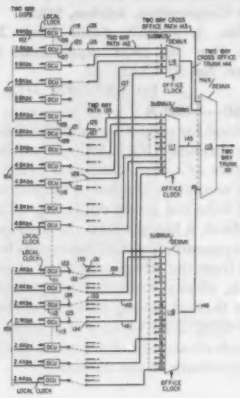
U.S. Cl. 179—15 BA **20 Claims**

1. A multiplexing system comprising:

a plurality of input terminals for providing data signals,

means for repeating each of the data signals from each of the terminals a number of times, *to achieve a high speed signaling rate*, the number being at least equal to the number of terminals, [to achieve a high speed signaling rate,] *whereby successive groups of repeated data signals from each terminal are formed, each group consisting of the number of repeated data signals*, the repeating means including means for aligning in time each of the repeated data signals *in each of the groups* with repeated data signals from the other terminals, and *for serially applying the successive groups of repeated data signals from each terminal to an individual signal path associated with each of the terminals, and*

means for interleaving one of [*each of*] *the number of repeated data signals from* [one of the terminals] *each group of repeated data signals applied to each individual*



signal path with [the] repeated data signals from the other terminals.

Re. 29,216

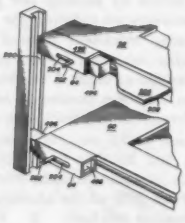
RADIOGRAPHIC DISPLAY SYSTEM WITH CASSETTE LOCK

Sergio Colombo, Milan; Vitaliano Carugati, Cassano Magnago (VA); Gianni Ferramola, Milan, and Sergio Ferrari, Cernusco S. Naviglio, all of Italy, assignors to Raytheon Company, Lexington, Mass.

Original No. 3,781,557, dated Dec. 25, 1973, Ser. No. 281,568, Aug. 17, 1972. Division of Ser. No. 81,214, Oct. 16, 1970, Pat. No. 3,735,132. Application for reissue Oct. 20, 1975, Ser. No. 624,192

Int. Cl.² G03B *5/17;* **G01T** *1/20*

U.S. Cl. 250—320 **10 Claims**



1. In a radiographic imaging system wherein an image is produced on a photographic film by means of a moving light stylus, the invention comprising:

a light-tight box enclosing said photographic film, said light-tight box having an opening for admitting light from said stylus and a shield adapted to cover said opening for excluding said light;

a structure for supporting said light-tight box in relation to said stylus; and

a lock positioned on said light-tight box, said lock comprising an elongated member slidably mounted for engaging alternately said shield or said structure.

Re. 29,217

DIGITAL CIRCUIT

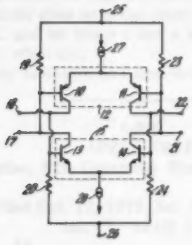
Yoshiki Higo, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Original No. 3,904,895, dated Sept. 9, 1975, Ser. No. 511,083, Oct. 1, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,288

Claims priority, application Japan, Oct. 3, 1973, 48-111126

Int. Cl.² H03K 3/286

U.S. Cl. 307—288 7 Claims



1. A digital circuit employing transistors operable in an unsaturated state comprising:

a pair of first transistors connected in a differential relationship with their emitters connected in common;

a pair of second transistors connected in a differential relationship with their emitters connected in common and with their collectors connected respectively to the bases of said first transistors, the collector of at least one of said first transistors being connected to the bases of the second transistors thereby forming a positive feedback loop between said pairs of transistors;

a first current source connected to the emitters of said first transistors;

a second current source connected to the emitters of said second transistors;

a first terminal for supplying a first constant voltage;

a first pair of resistors by which the first terminal is connected to the bases of the first transistors;

a second terminal for supplying a second constant voltage; and

a second pair of resistors by which the second terminal is connected to the bases of the second transistors;

whereby the state of the digital circuit is switched alternately in response to a control signal applied to the bases of one pair of transistors.

Re. 29,218

PACKAGED SEMICONDUCTOR DEVICE FOR MICROWAVE USE

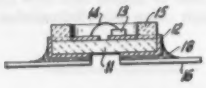
Shinzo Anazawa; Seiichi Ueno; Isamu Nagasako, and Shigeru Sando, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

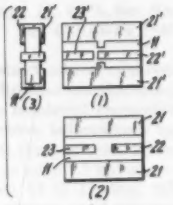
Original No. 3,908,186, dated Sept. 23, 1975, Ser. No. 481,458, June 20, 1974. Application for reissue Oct. 4, 1976, Ser. No. 729,286

Claims priority, application Japan, June 22, 1973, 48-69729

Int. Cl.² H01L 23/48, 39/02

U.S. Cl. 357—80 6 Claims





1. A packaged semiconductor device for use in the microwave frequency region, comprising a flat rectangular substrate of a dielectric material having substantially parallel top and bottom surfaces, first, second, third and fourth conductive layers formed on said substrate, a transistor element operable in the microwave frequency region, each of said layers having a first part formed on said top surface, a second part formed on said side surface, and a third part formed on said bottom surface, said first, second and third parts being electrically connected with each other, first, second and third parts of said first conductive layer extending along and over the entire length of one side of said substrate, the first, second, and third parts of said second conductive layer extending along and over the entire length of the opposite side of said substrate to said one side and in parallel with said first, second and third parts of said first conductive layer, respectively; the first, second and third parts of said third and fourth conductive layers being arranged respectively between said first, second and third parts of said first conductive layer and said first, second and third parts of said second conductive layer and extending in parallel with said first and second conductor layers, first parts of said third and fourth conductive layers being arranged in line, third parts of said third and fourth conductive layers being arranged in line, the first part of each conductive layer overlapping only with its own third part when viewed in a direction normal to said substrate; the collector of said transistor element being connected to said first part of said third conductive layer, the base of said transistor element being connected to said first part of said fourth conductive layer, and the emitter of said transistor element being connected to said first parts of said first and second conductive layers; and lead-out conductors respectively connected to said third parts of said first, second, third, and fourth conductive layers.

PLANT PATENTS

GRANTED MAY 10, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,049
ROSE PLANT — ZWEMANIA VARIETY

Jelle J. Zwemstra, Naaldwijk, Netherlands, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Oct. 14, 1975, Ser. No. 622,510
Claims priority, application Morocco, Oct. 23, 1974, 16932
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—18 **1 Claim**

1. A new and distinct variety of Grandiflora rose-plant of vegetative reproduction, characterized by the fact that,

from the physical point of view, the plant with Spinach green mature wood, is erect, the flower is double, light vermilion, the petals are very firm and give it a form which is, first of all, high-centered, then when open, the petals are projecting and overlapping;

from the biological point of view, this rose-plant is of vigorous vegetation, its capacity for re-blooming is excellent, either under glass or in the open air; it is very resistant to diseases, and its blooms last a long time, either on the plant, or when cut;

substantially as shown and described.

4,050
APPLE TREE

Saul L. Kaplan, 916 Greenway Road, Woodbridge, Conn. 06525

Filed Oct. 17, 1975, Ser. No. 623,395
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree, substantially as herein shown and described, characterized particularly as to novelty by its possession of a unique combination of characteristics, including a laterally branched habit with straighter branches and less tendency to meander than usually found in apple trees, fruit having skin of a deep, rich red color and flesh of an attractive cream color, tender, fine-grained, juicy and having present therein pink flecks adding to usual attractiveness, said characteristics being prevalent essentially before maturity is attained.

4,051
PEACH TREE

Henry Krahn, Sardis, Canada, assignor to May Nursery Company, Yakima, Wash.

Filed Jan. 16, 1976, Ser. No. 649,730
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—43 **1 Claim**

1. A new and distinct variety of peach tree characterized as to novelty primarily by the dwarf nature of its growth which is approximately one-quarter that of its parent Pacific Gold, foliage which is darker green, longer and denser with approximately 25 percent more chlorophyll than that of its parent Pacific Gold and with fruit similar to that of Pacific Gold and that ripens at substantially the same time as that of Pacific Gold.

4,052
CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Doylestown, and William E. Duffett, Akron, both of Ohio, assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Apr. 15, 1976, Ser. No. 677,410
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—82 **1 Claim**

1. A new and distinct cultivar of chrysanthemum known by the cultivar name Redcoat and characterized particularly as to uniqueness by the combined characteristics of flat inflorescence form, decorative inflorescence type, red-bronze inflorescence color with minimal color oxidation; diameter across face of inflorescence up to 3.5 inches; permanence of inflorescence ranging from 14 to 21 days; tall plant height; semi-upright branching pattern; good tolerance of inflorescence to frost damage; average natural season flowering date of September 26, and average flowering response period of 7 weeks in photoperiodic controlled flowering programs.

4,053
PLUM TREE

Susan A. Aldrich, Mukilteo, Wash., assignor to Stark Bro's Nurseries & Orchards Co., Louisiana, Mo.

Filed Apr. 22, 1976, Ser. No. 679,506
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—38 **1 Claim**

1. A new and distinct variety of plum tree, substantially as illustrated and described, which most nearly resembles the "Italian Prune" tree (unpatented), but from which it is distinguished by resistance to fungal and bacterial leaf spots, a more spreading growth habit, larger fruit, and earlier ripening fruit.

4,054
SCINDAPSUS AUREUS MARBLE QUEEN HEEYOUNG KIM

Heeyoung Kim, 922 W. Lee Drive, Santa Maria, Calif. 93454

Filed June 15, 1976, Ser. No. 693,788
Int. Cl.² A01H *5/12*
U.S. Cl. Plt.—88 **1 Claim**

1. A novel variety of Scindapsus, which differs from its parent, Scindapsus Marble Queen, by having larger, more rounded, more intensely colored leaves and thicker stems.

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PATENTS

GRANTED MAY 10, 1977

ERRATA

For CLASS	See PATENT NO.
126–271	4,021,895
403–388	4,021,991
082–058	4,022,085
029–156.7 R	4,022,583
228–122	4,022,584
428–551	4,022,585
075–125	4,022,586
075–171	4,022,587
062–164	4,022,598
062–244	4,022,599
062–381	4,022,600
175–040	4,022,658
428–041	4,022,926
358–128	4,022,970
358–124	4,022,972
361–043	4,023,070
361–056	4,023,071
361–050	4,023,072
361–045	4,023,073
361–088	4,023,074
361–076	4,023,075
361–118	4,023,076
361–187	4,023,077
361–339	4,023,078
361–433	4,023,079
355–051	4,023,126

PATENTS

GRANTED MAY 10, 1977

ERRATA

PATENTS

GRANTED MAY 10, 1977

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,021,858
FACE MASK

Gregory Patrick Neeld, and Norman George Neeld, both of 1210 Taylor Way, West Vancouver, British Columbia, Canada (V7T 2K3)

Filed Mar. 11, 1976, Ser. No. 665,949
Int. Cl.² A41D *13/00*
U.S. Cl. 2—9 **15 Claims**

1. A face mask for use with a hockey helmet the mask comprising a main support member, substantially U shaped and adapted to be attached to each side of the helmet at each upper end of the support member, said support member being shaped to extend down each side of the face of the wearer of the helmet and under the chin;

a cage rigidly attached to and extending outwardly from the main support member and across the lower face and under the chin of the wearer to protect the lower face;

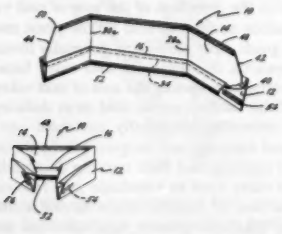
lower attachment means to attach the face mask to the helmet at a point remote from the attachment of the main support member to the helmet; and

a transparent, substantially U shaped screen of a break resistant material to extend completely around the face of the wearer of the face mask to protect the eyes and upper face of the wearer, and attached to the main support member at each side of the face mask, the screen being positioned to extend so that its upper edge overlaps with the lower edge of the hockey helmet and is spaced from the helmet at its upper edge, the bottom edge being close to the upper edge of the cage to prevent entrance of a relatively small object.

4,021,859
DISPOSABLE HATS

Francis V. Burke, Blackwood, N.J., assignor to Work Wear Corporation, Cleveland, Ohio

Filed Sept. 12, 1975, Ser. No. 612,903
Int. Cl.² A42B *1/22*
U.S. Cl. 2—197 **5 Claims**

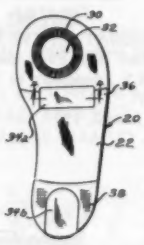


1. A disposable hat comprising a headband formed from a generally rectangular sheet of material folded along lines intermediate its shorter edges so that the end portions thereof are in overlapping relationship, said end portions being of a size and shape to be telescopically arranged with an inner surface of one end portion being adjacent to and in abutting relationship with an outer surface of the other end portion, each of said surfaces including a strip of adhesive of the type that adheres to itself only, the size of said headband being adjustable by adjusting the relative positions of the end portions and said end portions being secured in the adjusted position by the adhesive strips when said end portions are telescopically arranged, a crown extending from one longitudinal edge of said headband, said crown being formed from an elongated sheet of material folded along lines intermediate its shorter edges so that the end portions of said crown are in overlying relationship, a strip of adhesive extending adjacent the free longitudinal edge of said elongated sheet from one transverse edge toward the other transverse edge and terminating adjacent said other transverse edge whereby an area adjacent said other transverse edge is left without a strip of adhesive whereby the adjacent surfaces of said end portion are not adhesively secured.

4,021,860
NON-SLIP THERAPEUTIC STOCKING AND METHOD

Roger T. Swallow, Crystal Lake, Ill., and Leonard A. Stanley, Charlotte, N.C., assignors to The Kendall Company, Boston, Mass.

Filed Apr. 13, 1976, Ser. No. 676,447
Int. Cl.² A41B *11/02;* **A61F** *13/08*
U.S. Cl. 2—239 **20 Claims**



1. A foot covering garment comprising, a foot portion for covering the foot of a patient, said foot portion being circumferentially elastic to conform to the shape of the patient's foot, and a relatively inelastic strip of non-slip material attached to a circumferentially prestretched region of the foot portion underlying the foot, said strip being located to contact the floor beneath the patient's foot and minimize slippage of the patient on the floor.

16. A method of forming a non-slip region on a circumferentially elastic foot portion of a stocking, comprising the steps of:

stretching a lower area of said foot portion in a circumferential direction;

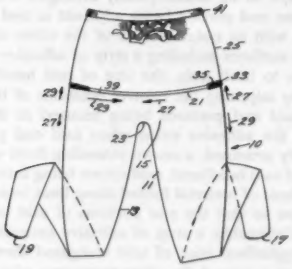
positioning a strip of thermoplastic material in said stretched area on the outside of said foot portion; and

applying heat and pressure to said strip during a period of time to fuse said strip to a region of the foot portion.

4,021,861
PANTYHOSE CONSTRUCTION

Walter H. Imboden, and Aaron Burleson, both of Burlington, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed Jan. 28, 1975, Ser. No. 544,680
Int. Cl.² A41B 9/04
U.S. Cl. 2—409 4 Claims



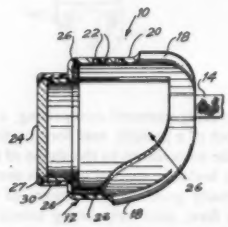
1. An improved seamless crotch pantyhose garment comprising:

an integrally knitted, continuous tubular blank having a pair of seamless tubular leg portions and a tubular body portion knit integral with and interconnecting said leg portions, said body portion defining a seamless crotch area and said body portion being slit walewise opposite said crotch area to define a body receiving opening, an over-edge seam stitched around the first knit end of said slit line, said over-edge seam gathering in a plurality of wales about a portion of said slit to thereby strengthen the portion of the slit perimeter covered by said over-edge seam, and said over-edge seam inhibiting the propagation of runs along the non-runproof direction of said tubular blank, and a rise portion sewn onto said portion about said slit to define with said body portion a panty portion extending upward to and about the waist.

4,021,862
RADIATION EYE SHIELD

Herman Glasser, New Hyde Park, and Patrick F. Panetta, East Islip, both of N.Y., assignors to Nuclear Associates, Inc., Carle Place, N.Y.

Filed June 2, 1975, Ser. No. 582,820
Int. Cl.² A61F 9/02; G21F 3/02
U.S. Cl. 2—431 13 Claims



1. A radiation eye shield device to be worn by a user for providing protection to said user's eyes from radiation, such as scattered radiation, comprising:

a frame having a front portion contoured to fit against said user's face, a top portion shaped to extend across the face just above the eyes of the user and connected to the top part of the front portion, a bottom portion shaped to extend across the face just below the eyes and connected to the bottom part of the front portion, said bottom portion having a contoured area to accommodate the user's nose, and side panels to cover the area bounded by the front portion, the bottom portion, the top portion and the side of the head, said side panels being connected to said front, bottom and top portions, said front portion having at least one cut-out area, so as to allow the user to see out from the frame;

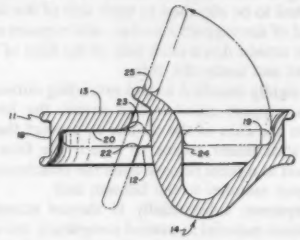
a radiation shield made of a radiation shielding material and of the same general shape as said frame in close juxtaposition to the frame, said shield having at least one cutout area corresponding in location to that of said cut-out area of said frame, said shield being designed to protect the user from radiation emanating from all directions, including from above, below and from the sides in addition to direct radiation from in front of the user; and

at least one transparent viewing window or lens made of a transparent radiation shielding material positioned in said cut-out area of said frame.

4,021,863
HEART VALVE PROSTHESIS

Arne Wøien, Lierbyen, Norway, assignor to M-K-V Corporation, Minneapolis, Minn.

Filed Sept. 13, 1976, Ser. No. 722,580
Int. Cl.² A61F 1/22
U.S. Cl. 3—1.5 6 Claims



1. A heart valve for controlling the flow of blood comprising:

a. a valve base of a generally annular configuration defining a circular opening therethrough, said valve base having an outflow side and an inflow said and an interior wall;

b. inflow pivot members extending inwardly from said wall into said opening along a chordal axis towards one another and in a first plane generally parellel to the plane of said valve base, said inflow pivots being spaced towards the inflow side of said valve base;

c. a single outflow pivot member extending radially into said opening from said wall and perpendicular to the chordal axis of said inflow pivot members, said outflow pivot member being generally in a second plane parallel to the plane of said valve base with the interior surface thereof spaced in the direction of the axis of said valve base from the interior surface of said inflow pivot members;

d. a disc guide strut projecting generally inwardly from said wall towards the center of said valve base opening in a third plane intersecting the axis of said valve base opening and of the outflow pivot, said strut defining an S-shaped curve extending diagonally upstream out of said valve base and curving back to pass axially through the center of said opening and then curving diagonally downstream of said valve base to terminate in a free end;

e. a valve disc of circular shape having a diameter slightly smaller than said opening, said valve disc defining an axial orifice therethrough of a diameter slightly larger than the diameter of said guide strut, said valve disc being mounted in said valve base with said guide strut extending through said orifice and being positioned when in the

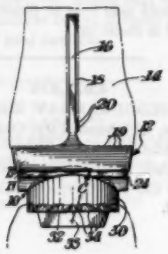
closed mode intermediate said inflow pivots and said single outflow pivot; and,

f. a valve disc stop shoulder extending inwardly from said wall on the side of said opening opposite said outflow pivot, said shoulder being in the first plane so that said valve disc in the closed position is in the plane of said valve base.

4,021,864
ANKLE PROSTHESIS

Theodore Rogers Waugh, Santa Ana, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed Apr. 14, 1976, Ser. No. 677,068
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.91 12 Claims

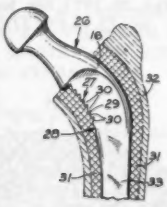


1. A partial prosthesis for a human ankle joint having a tibia and a talus comprising a tibial member, said tibial member having a tibial base, a tibial stem substantially centrally disposed upon the tibial base and extending upwardly therefrom to provide means for connecting said tibial member of the tibia, a concave toroidal section in the bottom of said tibial base, a talar member, a talar stem substantially centrally disposed upon the talar base extending downwardly for attaching it to said talus, a substantially convex toroidal section upon the upper surface of said talar member, said prosthesis having lateral/medial and anterior/posterior planes of movement, said toroidal sections each having a longer radius of curvature in said anterior/posterior plane than the radius of curvature in said lateral/medial plane whereby articulation is provided between the members in both planes with inherent stability.

4,021,865
FEMORAL PROSTHESIS

John Charnley, Birchwood, Moss Lane, Mere, Knutsford, England

Filed Aug. 14, 1975, Ser. No. 604,608
Claims priority, application United Kingdom, Aug. 29, 1974, 37732/74; Sept. 6, 1974, 38965/74
Int. Cl.² A61F 1/24
U.S. Cl. 3—1.913 9 Claims

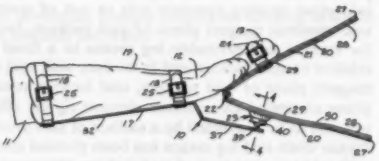


1. A femoral prosthesis comprising: a head supported by a neck projecting from an upper end of a stem having an upper curved portion defined by a curved bottom surface, an opposed convexly curved top surface and opposed side walls therebetween a flange extending laterally outwardly rearwardly from the convex top surface of the stem in a direction generally transverse to sa' ! side walls, the flange being operative when the prosthesis is mounted in a femur by cement for transmitting applied loads in a cushioning manner to the cement and bone surrounding the upper portion of the prosthesis.

4,021,866
HAND PROSTHESIS

Joseph L. Wasko, Rte. 1, Buhl, Idaho 83316

Filed Sept. 27, 1976, Ser. No. 726,934
Int. Cl.² A61F 1/06
U.S. Cl. 3—12 8 Claims



1. A hand prosthesis for use with an arm having a functional joint and movable portion of the arm outward of the joint, comprising;

an elongated base member;

means on the base member for securely mounting the base member to a user in stationary relation to the movable arm portion;

first and second elongated plates having inward and outward ends;

hinge means pivotably joining the elongated plates at their inward ends;

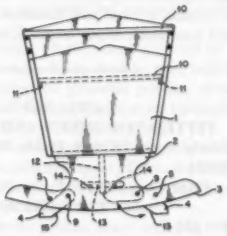
mounting means pivotably connecting the first plate to the base member; and

means fastened to the second plate for mounting the second plate to the movable portion of the arm.

4,021,867
CONVERTIBLE CRADLE

Oscar Benton Maxwell, Jr., 5309 Robins Drive, Raleigh, N.C. 27610

Filed Sept. 8, 1975, Ser. No. 611,522
Int. Cl.² A47N 9/02
U.S. Cl. 5—106 6 Claims



1. An article of furniture convertible for fixed or rocking actions, comprising:

a cradle body means having ends, side walls and a bottom panel for supporting an infant or other contents;

at least two arcuately edged rocker means affixed to said body with said arcuate edges having a convex shape relative to the bottom panel of said body and being disposed tangent to a common plane;

at least two brace means, each connecting and joining an inner face at the outer end of said rocker means to the

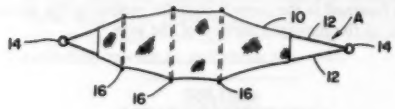
oppositely disposed inner face at the outer end of each of said other rocker means;

said brace means being provided with circular cross-sections near their said junctures with their outer portions of said rockers;

at least two leg means for contacting said common plane to which the arcuate edges of said rockers are tangent, each said leg means having, near one end thereof, a circular pivot bearing aperture with an inside diameter to accommodate the outside diameter of the circular cross-section of said brace means, the circular cross-section of each said brace means being assembled to pass through, and form a pivot bearing with, the aperture in said leg means and then into the end of said rocker; and

said leg means being pivotable on said pivot bearing to position the ends of said legs opposite said ends having said pivot bearing aperture into or out of contact with said common tangent plane of said rockers, lock means for locking said pivotable leg means in a fixed position relative to said rockers and in contact with said common tangent plane of said rockers, said locking means comprises an angled cam surface element rigidly affixed in a position to be contacted by a surface of said pivotable leg means when said leg means has been pivoted into contact with said tangent plane of said rockers, the cam surface of said lock means being oriented to wedge said pivoting leg means between said cam surface and toward the surface of said rocker means.

4,021,868
CONTOUR HAMMOCK
Jerome L. Fueslein, 6801 E. Highway 4, Stockton, Calif. 95206
Filed Nov. 7, 1975, Ser. No. 629,825
Int. Cl.² A45F *3/22*
U.S. Cl. 5—123 **10 Claims**



1. A contour hammock comprising a pair of flexible longitudinal lines, a hammock sheet carried solely between said longitudinal lines, said hammock sheet being longitudinally slideable relative to said longitudinal lines to minimize longitudinal tensioning of said hammock sheet and spreader means for maintaining said longitudinal lines in spaced apart relationship in the central area of said hammock sheet to transversely tension said hammock sheet under load.

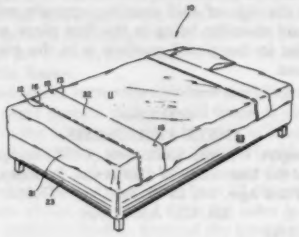
4,021,869
FITTED TOP SHEET AND BLANKET
William Edwin Root, 7410 N. Dakin St., Apt. E-302, Denver, Colo. 80221
Filed Nov. 24, 1975, Ser. No. 634,785
Int. Cl.² A47G *9/00*
U.S. Cl. 5—334 C **1 Claim**

1. A fitted top sheet or blanket for beds, the sheet or blanket manufactured to fit any size bed, the invention comprising, in combination:

elastic binding conventionally stitched around the bottom edges and corners of a sheet or blanket for snugly securing a sheet or blanket to the bottom edge and bottom corners of a bed mattress; and

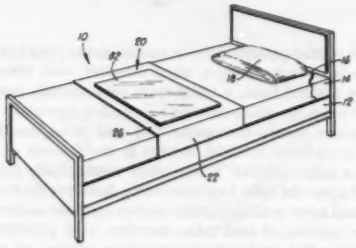
a stitch-in fold toward the bottom of said sheet or blanket for foot comfort, said fold being (provided) conventionally stitched laterally across the entire width of said sheet or blanket; and

a series of conventional snaps (provided) sewn along the top portion of said fold and along the bottom portion of



said fold to hold said fold in place for neat appearance when the bed is made up.

4,021,870
BEDDING DRAW SHEET
Ronald D. Walters, Oklahoma City, Okla., assignor to Hygeia Corporation, Oklahoma City, Okla.
Filed Jan. 23, 1976, Ser. No. 651,643
Int. Cl.² A47G *9/00*; A61G *7/06*
U.S. Cl. 5—334 R **7 Claims**



1. An improved draw sheet for bedding which comprises:

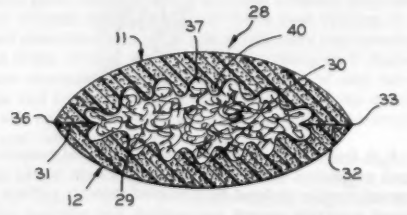
a base sheet formed of textile material;

a panel formed of a fine weave textile material having water penetration-resistant characteristics bonded to said base sheet by means of a polyethylene binder;

a water-absorbent pad positioned adjacent to said panel; and

means for removably attaching said water-absorbent pad connected to said water-resistant panel and to said pad.

4,021,871
PROCESS AND STRUCTURE FOR PILLOW MAKING
Harold Wortman, 5936 Monroe St., Morton Grove, Ill. 60053
Filed Oct. 20, 1975, Ser. No. 623,613
Int. Cl.² A47C *21/00*
U.S. Cl. 5—337 **7 Claims**



1. A pillow cushion construction comprising:

a plurality of resilient foam panels forming upper and lower portions of said cushion;

raised projections on one side of said upper and lower portions respectively;

said projections on said upper portion directly opposing said projections on said lower portion when said portions of said cushion are attached together at their edges by cushion attachment means; and

a fibrous textile filler positioned between said opposing projections on said upper portion and said projections on said lower portion, when said edges of said cushions are joined by said cushion attachment means,

said fibrous filler also occupying a position separating adjacent protrusions from one another on each of said upper and lower portions respectively, while yielding to provide an amount of interlace between said protrusions on said upper and lower portions, where said fibrous filler occupies an internal cushion cavity formed by said upper and lower portions of said cushion.

4,021,872

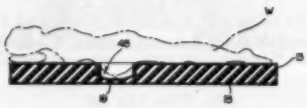
MATERNITY MATTRESS

Lee V. Powell, 4534 White Pine, Memphis, Tenn. 38109

Filed Oct. 6, 1975, Ser. No. 620,029

Int. Cl.² A47G *9/00*

U.S. Cl. 5—338 **10 Claims**



1. A maternity mattress comprising a core body enveloped within a mattress tick, said core body being provided with at least one circular cavity having a predetermined size and vertical cross-sectional shape for accommodating the abdomen of a pregnant woman as she lies upon the mattress in a prone position, said mattress tick including a removable circular portion normally being disposed conterminously above said cavity for selectively providing a circular hole to readily expose said cavity therethrough, and resilient filling means for filling said cavity and for gradually changing the size of said cavity, said filling means including a plurality of disklike members jointly conforming in size and shape with said cavity and normally being removably received therein with said disklike members intended to be removed one at a time from said cavity as the pregnancy progresses thus gradually increasing the size of said cavity.

4,021,873

CIRCULAR WATERCRAFT

Joseph S. Francois, Rte. 2, New Richmond, Wis. 54017

Filed Nov. 3, 1975, Ser. No. 627,903

Int. Cl.² B63B *7/08*

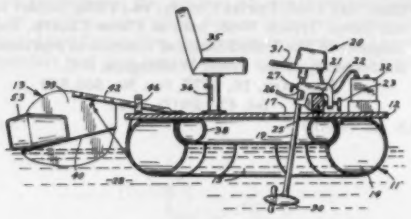
U.S. Cl. 9—2 A **15 Claims**

1. A watercraft including:

a hull comprising a first buoyant toroidal pontoon having flexible side walls and a central opening open to the water when the watercraft is situated in a body of water;

a rigid deck secured to the top of the first pontoon;

a second buoyant toroidal pontoon for auxiliary buoyancy having flexible side walls, a central opening, and a normal outside diameter slightly larger than the normal diameter of the central opening of the first pontoon, said second pontoon being frictionally nested within the central opening of the first pontoon adjacent to and beneath the deck in position normally out of the water when the watercraft is in a body of water and under normal loading conditions and coming into buoyant engagement with the water



under abnormal loading conditions tending to lower the deck towards the water.

4,021,874

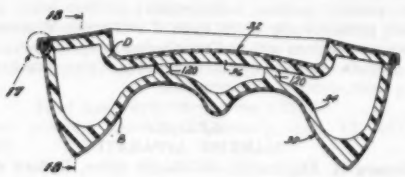
BOAT HULL

Hobart L. Alter, Capistrano Beach, and Peter L. V. Hutchinson, Anaheim, both of Calif., assignors to Coast Catamaran Corporation, Irvine, Calif.

Division of Ser. No. 352,753, April 18, 1973. This application May 23, 1975, Ser. No. 580,420

Int. Cl.² B63B *5/24*

U.S. Cl. 9—6 P **6 Claims**



1. A closed boat hull, comprising:

a main body shell consisting of a vacuum-formed synthetic plastic sheet and having a heat-activated adhesive on its interior surfaces except along the gunwale portion of said shell;

a layer of fused synthetic plastic foam secured to the interior surfaces of said main body shell by said heat-activated adhesive except along the gunwale portion of said shell;

a plurality of longitudinal and transverse upstanding main body ribs integral with said foam layer;

a deck shell complementary to said main body shell consisting of a vacuum-formed synthetic plastic sheet and having a heat-activated adhesive on its interior surfaces except along the gunwale portion of said shell;

a layer of fused synthetic plastic foam secured to the interior surfaces of said deck shell by said adhesive except along the gunwale portion of said shell, with the underside of said foam layer being adhered to the upper ends of said main body ribs, the foam affording sufficient buoyancy to render the boat hull unsinkable and also providing rigidity for said boat hull without utilizing other than said main body and deck shells; and

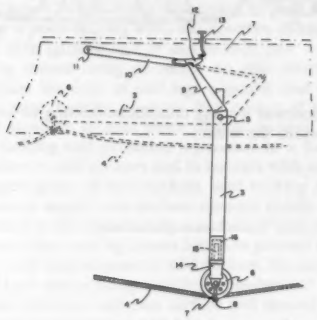
with the gunwale portions of said shells telescopically interfitting and being interconnected at longitudinally spaced points by fastening means extending through said gunwale portions.

4,021,875

PIVOTABLE AND EXTENSIBLE TENSION POST FOR A CABLE BRIDGE STRUCTURE

William Ray Abell, Fairfax County, Va.; Philip Stanley Bulson, and Robin Trench Weld, both of Christ Church, England, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 10, 1975, Ser. No. 566,849
Int. Cl.² E01D *15/12*
U.S. Cl. 14—10 **3 Claims**



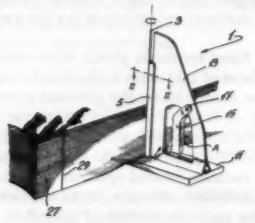
1. A bridge structure having at least one tensioning cable attached thereto at two longitudinally spaced points, at least one post pivoted to said bridge structure at a location between said spaced points, an end of said post spaced from the pivot connection to said bridge structure adapted to engage the cable and movable therealong; means associated with and attached to said bridge structure and said post for rotating said post about the pivot connection to said bridge structure into its operative position, said operative position being substantially perpendicular to the span of said bridge structure; and means associated with and attached to said post for extending the length of said post such that said post places said tensioning cable under tension condition.

4,021,876

MARKING APPARATUS

Bernard H. Engelhardt, 48 Manual Drive, Dollard des Ormeaux, Quebec, Canada

Filed May 17, 1976, Ser. No. 687,089
Int. Cl.² A41H *43/00*
U.S. Cl. 15—3 **10 Claims**



1. An apparatus for imprinting a complete elongated straight mark in one stroke on a suitable object or stack of objects without the use of separate guide means, said apparatus comprising:

an elongated cylindrical rod comprising the marking element;

holder means being substantially U-shaped in cross section, said elongated rod being disposed between the legs of the U defined by the cross section of the holder such that a portion of the side of the elongated rod is disposed within the U and a portion of the side of the elongated rod extends outside of the U;

means for providing ink to the outer surface of said rod; and

means for rotating said elongated rod about its longitudinal axis;

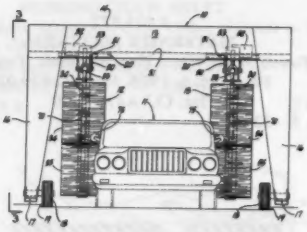
whereby the rod imprints said elongated mark, having the shape of said elongated rod, on said object or stack of objects when it is adjacent an edge thereof with the ink on its outer surface.

4,021,877

BRUSH ASSEMBLY FOR VEHICLE WASH APPARATUS

Earl L. Miner, Long Lane, Mo., assignor to Detroit Tool & Engineering Co., Lebanon, Mo.

Filed June 27, 1975, Ser. No. 591,091
Int. Cl.² B60S *3/06*
U.S. Cl. 15—53 A **12 Claims**



1. A brush assembly for a vehicle washing apparatus, the brush assembly comprising:

a. shaft means,

b. a first rotary brush means fixedly mounted to the shaft means for rotation with said shaft means, said first brush means being engageable with the vehicle,

c. a second rotary brush means mounted to the shaft means in endwise relation to the first rotary brush means for rotation relative to said shaft means, said second brush means being engageable with the vehicle,

d. clutch means operatively disposed between the shaft means and the second brush means and having a predetermined slip resistance, the engagement between the second brush means and the vehicle providing the torsional force tending to overcome the clutch resistance to cause said relative rotation between said second brush means and said shaft means,

e. said clutch means including resilient means operatively disposed between the shaft means and the second brush means urging said second brush means and said shaft means into engagement.

4,021,878

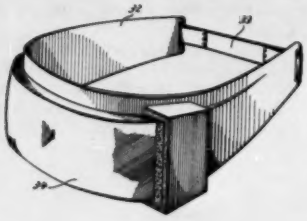
PROTECTING GLASSES

Paul Peillex, Thonon les Bains, France, assignor to Arisara Investment Corporation, Curacao, Netherlands Antilles

Filed Feb. 4, 1975, Ser. No. 546,886
Claims priority, application Switzerland, Mar. 15, 1974, 3605/74; Feb. 19, 1974, 2265/74
Int. Cl.² B60S *1/06, 1/44*
U.S. Cl. 15—250.28 **5 Claims**

1. Protection glasses comprising a screen which is at least partially transparent, the screen having upper and lower substantially horizontal edges, and at least one movable wiping member that wipingly engages at least one face of said screen, and means mounting said wiping member slidable to engage

said upper and lower edges of said screen thereby releasably to retain said wiping member in horizontal sliding engagement with said screen, said protection glasses comprising an arcuate frame that at least partially encircles the head of the user, said screen being arcuate and integral with said frame, there being a said wiping member on each side of said screen thereby to



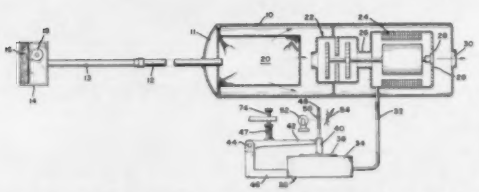
wipe both the inner and the outer faces of said screen, said screen having at least one flange along at least one said horizontal edge thereof, said wiping member having a flange that engages with said screen flange, said screen flange defining with an edge portion of said screen an outwardly opening arcuate horizontal trough, said wiping member flange being slidably seated in said trough.

4,021,879

CONSTANT PERFORMANCE VACUUM CLEANER

Robert Norman Brigham, Monroe, Conn., assignor to Consolidated Foods Corporation, Old Greenwich, Conn.

Filed Nov. 28, 1975, Ser. No. 636,206
Int. Cl.² A47L *5/00*
U.S. Cl. 15—319 **9 Claims**



1. In a vacuum cleaner, a housing having an intake opening and an exhaust opening to atmosphere, a dust filter within said housing between said openings, means for introducing dust-ladened air into said housing through said intake opening to one side of said filter, air moving means within said housing having an inlet communicating with the other side of said filter and an outlet communicating with said exhaust opening, a motor for driving said air-moving means, a fixed orifice disposed across the path of airflow in said housing between said outlet and said exhaust opening to atmosphere, and means responsive to variations in air pressure occurring in the path of airflow between said outlet and said orifice for varying the speed of said motor in a manner to maintain substantially constant the volume of air per unit of time flowing through said housing.

4,021,880

GATE STOP

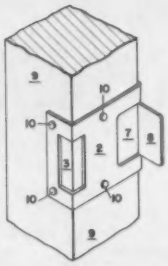
Edward Patrick Murphy, 2994 Knoll Drive, Concord, Calif. 94520

Filed July 29, 1976, Ser. No. 709,879
Int. Cl.² E05F *5/02*
U.S. Cl. 16—82 **11 Claims**

1. A gate stop comprising:

1. a flat plate having on the face of the plate a forward first section, a central second section, and a rear third section, each of said sections extending from the upper boundary of said plate to the lower boundary;

2. a narrow slit through the face of said plate following a path beginning at the junction of said second and said third sections near said lower boundary, extending toward said first section, then upwardly toward said upper boundary and then toward said third section, and terminating at the junction of said second and said third sections near said upper boundary to form a flap defined by said slit which projects outwardly in the same plane from said third section when said third section is bent perpendicular to said second section; and



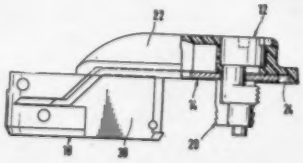
3. a weakened area at the junction of said first section and said second section to allow said first section to be bent perpendicular to said second section.

4,021,881

HINGE HOUSING FOR FURNITURE PIECES

Karl Lautenschläger, Reinheim, Germany, assignor to Karl Lautenschlager KG Mobelbeschlagfabrik, Reinheim, Germany

Filed Apr. 12, 1976, Ser. No. 676,027
Claims priority, application Germany, Apr. 12, 1975, 2516083
Int. Cl.² F05D *5/02*
U.S. Cl. 16—159 **14 Claims**

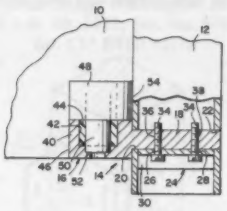


1. In a housing for supporting furniture hinges in the material of a furniture piece having a plug-in casing connected with a flange plate and a plug-in pin wherein the pivot point for the hinges is provided, the improvement comprising a hollow plug-in pin, an eccentric part pivotably mounted within said hollow plug-in pin, said eccentric part having an eccentric segment, a flat locking member which is displaceable parallel with respect to the plane of the flange plate said eccentric segment engaging said flat locking member for displacing the locking member in response to the pivoting of said eccentric part from a rest position into a locking position, so that the locking member is retracted into the outer periphery of the flange plate housing, wherein it protrudes partly from the housing and penetrates into the material of the furniture piece which surrounds the housing.

4,021,882
REVERSIBLE DOOR PIVOT

Ricardo Polanco, 404 Ocean Ave., Brooklyn, N.Y. 11226

Filed Jan. 15, 1976, Ser. No. 649,311
Int. Cl.² E05D 7/02
U.S. Cl. 16—170 6 Claims

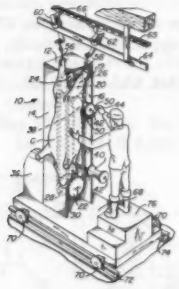


1. A reversible door pivot comprising:
a standing hinge member;
said standing hinge member having an elongated shank adapted to be inserted through a door jamb and a head having an opening therein in abutment with the exterior of said jamb;
a support plate adapted to positioned within said jamb in supporting contact with said shank; and
a swinging hinge member adapted to be fixed to a door,
said swinging hinge member having a depending pivot pin rotatably insertable within the opening in said head of said standing hinge member.

4,021,883
METHOD OF AND APPARATUS FOR REMOVING HIDE FROM AN ANIMAL CARCASS

Carl Oscar Schmidt, Jr., Cincinnati, Ohio, assignor to The Cincinnati Butchers' Supply Company, Cincinnati, Ohio

Filed Dec. 1, 1975, Ser. No. 636,808
Int. Cl.² A22B 5/16
U.S. Cl. 17—21 10 Claims

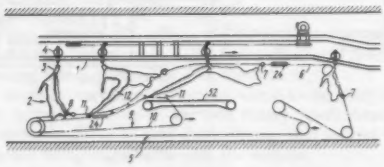


1. A hide puller comprising:
an upstanding support structure;
a pair of laterally spaced, parallel endless flexible members carried by and movable relative to said support structure along upright paths which include a descending reach and an ascending reach, said flexible members having inner sides generally disposed toward each other and outer sides generally disposed away from each other;
power means connected to said flexible members to impart essentially synchronous movement thereto;
a horizontally extending elongate anchoring member located between said flexible member reaches and having one end thereof fixedly mounted on said support structure adjacent one of said flexible members and another end thereof free and located outwardly of and beyond a vertical plane defined by said outer side of the other flexible member so that said anchoring member projects horizontally outwardly of and beyond said other flexible member outer side;
a horizontally extending elongate support member secured to both of said flexible members for movement therewith, said support member having a free end located outwardly of and beyond said vertical plane;
connecting means for releasably connecting a hide to said anchoring member thereby fixing the hide to said support structure; and
contacting means on said support member for contacting said connecting means at a location between the hide and said anchoring member so that movement of said flexible members is transmitted to said connecting means via said contacting means for pulling the hide from a carcass suspended adjacent said support structure.

4,021,884
APPARATUS FOR STRIPPING HIDE FROM ANIMAL CARCASSES

Alexandr Nikolaevich Saltykov, proezd Dezhneva, 26, korpus 2, kv. 82; Vasily Matveevich Gorbatov, prospekt Mira, 74, kv. 70; Jury Alexandrovich Saltykov, Yasny proezd, 12, korpus 2, kv. 174, and Oleg Alexandrovich Saltykov, proezd Dezhneva, 26, korpus 2, kv. 82, all of Moscow, U.S.S.R.

Filed Apr. 4, 1975, Ser. No. 565,257
Claims priority, application U.S.S.R., Apr. 17, 1974, 2012229
Int. Cl.² A22B 5/16
U.S. Cl. 17—21 5 Claims

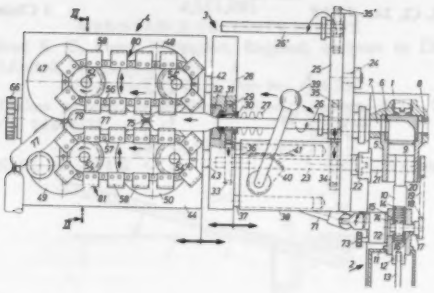


1. An apparatus for stripping hide from an animal carcass, comprising: parallel overhead rails for suspending a carcass therefrom; anchoring members for suspending the carcass, anchored thereby with the hind legs, to said rails; a first vertically extending chain conveyor for anchoring thereto the fore legs of the carcass, disposed below said rails; a second vertically extending conveyor for gripping portions of preliminarily undercut hide, disposed within said first conveyor and extending parallel therewith; an electric motor for driving said conveyors in the same direction but at different speeds; curvilinear guides for movement of said conveyors therealong; said guides being substantially parallel to one another, defining acute angles with respect to at least one of said conveyors, diverging in a vertical plane by an adjustable angle, and being divided into portions so that at one portion the hide is stripped in the transverse direction relative to the displacement of the carcass by said conveyors, and at another portion the hide is stripped lengthwise of the carcass; third and fourth chain conveyors extending horizontally, parallel with and above said rails along said first and said second conveyors, and having a length corresponding to that of said first conveyor; spring-loaded pins serving as stops for said anchoring members, mounted on said third and said fourth conveyors; a brake for said third and said fourth conveyors; and an electric control circuit coupling said motor to said brake so as to control the braking force depending on the load on said motor.

4,021,885
METHOD OF AND APPARATUS FOR MAKING LINK SAUSAGES

Johann Muller, Biberach, Germany, assignor to Firma Albert Handtmann, Biberach, Germany

Filed Jan. 13, 1975, Ser. No. 540,722
Claims priority, application Germany, Jan. 22, 1974, 2402817
The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.
Int. Cl.² A22C *11/00*
U.S. Cl. 17—33 7 Claims



1. In an apparatus for making sausage links of uniform length and weight in a common sausage casing, wherein a filling pump injects a sausage-stuffing mass into a stuffing tube on which the slack sausage casing is carried, a braking and twisting device is provided at a free end of the sausage stuffing tube for holding back and twisting the slack sausage casing relative to the filled links downstream of the tube, and a conveyor downstream from the twisting device for advancing and holding the filled links against rotation, the conveyor engaging the filled links externally with a plurality of suport elements displaceable in the direction of advance of the filled links away from said tube and being drivable with variable speed, the improvement wherein:

said support elements of said conveyor form support surfaces transverse to the direction of advance; and

means is provided for controlledly operating said twisting device intermittently in dependence upon the quantity of sausage filling injected into the case from said tube over a previous time interval, said support elements being oppositely symmetrically adjustable relative to an axis of advance of the filled links at said end of said tube.

4,021,886
APPARATUS FOR SCORING CRAB CLAWS AND THE LIKE

Melvin J. Crepeau, St. Petersburg, Fla., assignor to Harry H. Bell & Sons, Inc., St. Petersburg, Fla.

Filed Oct. 24, 1975, Ser. No. 625,494
Int. Cl.² A22C *29/02*
U.S. Cl. 17—71 17 Claims

1. An apparatus for scoring the shell of an unshelled crab claw or the like comprising, in combination:

cutter means for cutting through the crab claw shell;

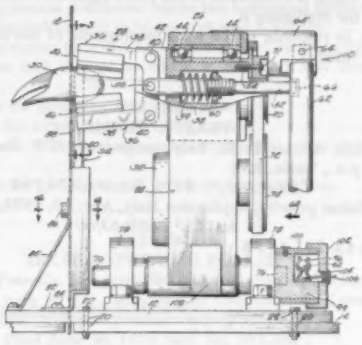
a frame;

gripping means rotatably supported on said frame for receiving one end of a crab claw and releasably holding the crab claw in a transversely extended position relative to said cutter means;

means for moving one of said cutter means and said frame relative to the other between a retracted position where a crab claw held in said gripping means is spaced from said cutter means and a scoring position where said cutter means engages the crab claw shell and makes a cut therein,

means for rotating said gripping means relative to said cutter means, and

depth gauge means including a camming surface which is slidably engageable by the outer surface of the crab claw held in said gripping means and is located such that, when

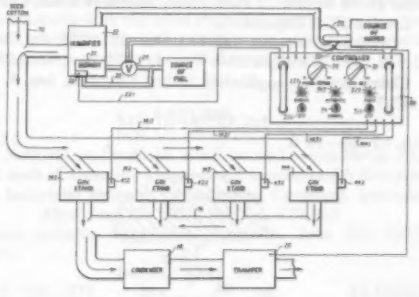


said one of said cutter means and said frame is moved to said scoring position and said gripping means is being rotated by said rotating means, the outer surface of the crab claw rotatably rides against said camming surface and a continuous circumferential cut of predetermined depth is made through the crab claw shell by said cutter means.

4,021,887
COTTON GIN CONTROL

Samuel G. Jackson, P.O. Box 16587, Lubbock, Tex. 79490

Filed Sept. 29, 1975, Ser. No. 617,681
Int. Cl.² D01B *1/04*
U.S. Cl. 19—66 R 20 Claims



11. In a cotton gin plant having

a. a plurality of stands and

b. other operatively associated equipment,

c. an improved control circuit for some of the other equipment in the gin plant in combination comprising:

cc. two resistors for each gin stand,

d. electromechanical relays, each energized by the activation of one of the stands, and

e. each relay, when activated,

i. shorts one of said resistors which is normally unshorted, and

ii. ceases shorting the other of said resistors, which is normally shorted,

f. the two resistors each having a value of resistance proportional to the ginning rate of the stand which activated the relay, and

g. the normally shorted resistors connected in series, forming a series circuit,
h. the normally unshorted resistors connect in series, forming a series circuit,
j. one end of each of the series circuits joined,
k. the junction and opposite ends of the two series circuits comprise the terminals of a simulated potentiometer which is connected to the other equipment and is means for regulating it
m. in response to the total ginning rate of the stands activated.

4,021,888

PLASTIC CLAMP

Michele Aimar, Turin, Italy, assignor to ITW Fastex Italia, S.p.A., Turin, Italy

Filed Apr. 8, 1976, Ser. No. 674,794
Claims priority, application Italy, Apr. 29, 1975, 22830/75
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB 2 Claims

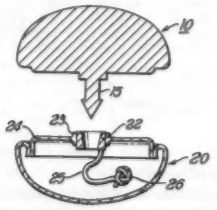
1. A one-piece plastic clamp for tightening a bundle of elongated elements comprising a head portion having a passage therein and an integral strap provided with ratchet teeth, a pawl formed in said passage integrally with said head portion, characterized in that said pawl includes means connected to the head body, said means including a pair of coaxially extending torsion pins formed on two opposite sides of said pawl, said pawl including complementary ratchet teeth for engagement with the strap when it is passed around the bundle of elongated elements and threaded into the passage for tightening said elements.

4,021,889

BUTTONING MEANS AND A BUTTONING METHOD

Peter David Benmax, 2 Park Close, Ellesmere Road, Chiswick, London W.4, England

Division of Ser. No. 425,733, Dec. 18, 1973, Pat. No. 3,942,224. This application Dec. 4, 1975, Ser. No. 637,688
Claims priority, application United Kingdom, Jan. 9, 1973, 1187/73
Int. Cl.² A44B *11/18*
U.S. Cl. 24—90 B 2 Claims



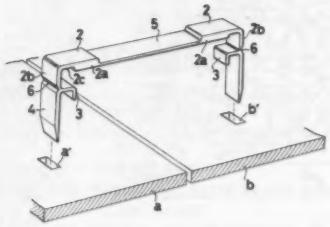
1. A buttoning means comprising in combination a pair of tufting buttons at least one of which is hollow and includes means defining an opening therein, the other of said buttons including an offstanding barbed shank portion terminating in a sharp point, adapted to be inserted in the means defining the opening in said first named button, said means defining the opening in said first named button including a separable collar element, tethering means connected to said collar element at one extremity thereof and having means at the other extremity to prevent removal of said tethering means from said means defining the opening, said tethering means being capable of retaining the said buttons in predetermined spaced relation after extraction of the collar element from said hollow button by said barbed shank upon assembly with an overstuffed article and said article has attained its finished dimension.

4,021,890

LINKING DEVICE FOR UNITING TWO PLATES IN ABUTMENT

Mutsuo Kurosaki, Moriguchi, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed July 28, 1975, Ser. No. 599,621
Claims priority, application Japan, July 30, 1974, 49-90127
Int. Cl.² B65D *45/16*
U.S. Cl. 24—73 PF 3 Claims



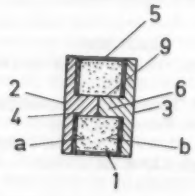
1. A linking device for uniting the edges of two apertured plates in abutment along said edges, said device including a pair of engaging members each formed as an L-shaped main trunk section and a flexible connecting strip extending between and connecting the end of one of said pair of main trunk sections to the end of the other main trunk sections, the forward perpendicular free end of each L-shaped section includes and is connected to an intervening flexible hinge portion connected to an inserting and engaging portion substantially co-planar with said perpendicular free end and having a hook element integrally incorporated therein, said two engaging members being disposed so that the hook elements respectively thereof symmetrically confront each other.

4,021,891

MAGNETIC LOCK CLOSURE

Tamao Morita, Tokyo, Japan, assignor to Application Art Laboratories Co., Ltd., Tokyo, Japan

Filed Apr. 18, 1974, Ser. No. 462,174
Int. Cl.² A44B *17/00*
U.S. Cl. 24—201 B 8 Claims



1. A magnetic lock closure for use with handbags and similar containers comprising:
magnetic means for supplying magnetic attraction having a first side and a second side of opposite polarities and a hole therethrough between said two sides;
first ferromagnetic material means rigidly secured to said first side of said magnetic means over said hole for centering the force of the magnetic attraction of said magnetic means; and
second ferromagnetic material means removably positioned

against said second side of said magnetic means for contacting and being attracted to said first ferromagnetic means through said hole, said second ferromagnetic material means comprised of:

a plate adjacent said second side of said magnetic means over said hole, and

a rod the shape of said hole rigidly attached to said plate extending through said hole and contacting said first ferro-magnetic material means, whereby said second ferromagnetic material means is magnetically attracted and connected to said first ferromagnetic material means through said hole.

4,021,892

ADJUSTABLE SECURITY STRAPS

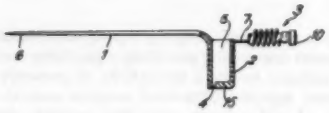
Alfred E. C. Piper, Hillingdon, England, assignor to ITW Limited, Slough, England

Filed Mar. 5, 1976, Ser. No. 664,350

Claims priority, application United Kingdom, Mar. 20, 1975, 11600/75

Int. Cl.² F16L *33/08*

U.S. Cl. 24—274 R 9 Claims



1. A one-piece plastic strap including an elongate strap portion, a substantially tubular housing part, and a screw member, said housing part being a hollow D-shaped tubular member having one open end and being attached adjacent said open end to one end of said strap portion, said screw member being initially connected by frangible means to said housing, said screw further having a head and a threaded shank joined to one another by a weakened section, said shank being positioned, in use, inside said housing part, said housing part having a closed end remote from said open end and a slot in said closed end adjacent the flat portion of said D-shaped member through which said strap portion may pass, co-operating means on said strap portion including a series of complementary slots on said strap portion adapted to engaging the threads on said screw member, whereby rotation of said screw member causes said strap portion to be drawn through said housing part.

4,021,893

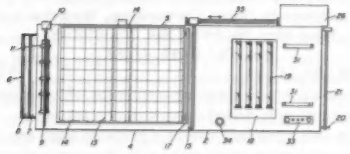
INSPECTION DEVICE

Earl R. See, Conyngham, and Gregory E. Slowicki, Mountaintop, both of Pa., assignors to Formica Corporation, Cincinnati, Ohio

Filed Apr. 27, 1976, Ser. No. 680,656

Int. Cl.² D06H *3/04*

U.S. Cl. 26—70 5 Claims



1. An inspection device comprising

a. four legs and a horizontal platform having a front and back edge,

b. trough means attached to one end of said device adjacent said platform,

c. roller means pivotly affixed at one end thereof to said back edge of and extending across to said front edge of said platform,

d. a transparent gridded sheet pivotly affixed at one side thereof to said back edge of and extending across to said front edge of said platform,

e. cutting means pivotly affixed to said back edge of said platform having a cutting edge adapted to slide across said platform to said front edge thereof,

f. lighting means positioned below the horizontal surface of and adapted to emit light through said platform,

g. roll-up means attached to the end of said platform opposite the end thereof to which is attached said trough means,

h. means for actuating said roller means,

i. means for actuating said roll-up means,

j. means for pivotly raising and lowering said roller means, and

k. means for pivotly raising and lowering said sheet.

4,021,894

TEXTILE SPREADER ROLLER

Robert J. Poterala, Simpsonville, and Marshall C. Richards, Taylors, both of S.C., assignors to Crompton & Knowles Corporation, Worcester, Mass.

Filed June 30, 1975, Ser. No. 591,562

Int. Cl.² D06C *3/06*

U.S. Cl. 26—105 6 Claims

1. A spreader roller for textiles comprising: a. a corrugated tube seamless along its longitudinal axis having inner and outer helical ridges, the outside of said tube having at least one helical ridge on each longitudinal half of the tube, the outer ridge on one longitudinal half of said tube being of opposite hand to the outer ridge on the other longitudinal half of the tube;

b. a cylindrical supporting member positioned within said corrugated tube in substantially coaxial relationship therewith and having a smooth outer surface in abutting relationship with the inner ridges of said corrugated tube; and means for fastening said corrugated tube to said supporting member along said inner ridges.

4,021,895

SOLAR HEATING

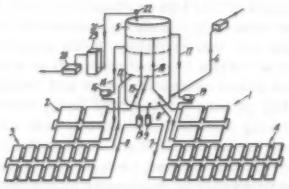
Roger Neill Morse, Caulfield, and Edward Thomas Davey, Box Hill, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed June 13, 1974, Ser. No. 479,065

Claims priority, application Australia, June 18, 1973, 3703/73

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 10 Claims



1. A method of solar heating a fluid stored in a plurality of storage zone means which are fluidly connected to each other in series comprising taking the fluid at a first temperature from a first storage zone means and passing said fluid through a first

solar heating means having a first thermal efficiency related to said first temperature to raise the temperature of said fluid to a second temperature higher than said first temperature, returning said fluid at said second temperature to said first storage zone means, taking fluid from said second storage zone means and passing said fluid through a second separate solar heating means independent from said first solar heating means having a second thermal efficiency higher than said first thermal efficiency to raise said fluid to a third temperature higher than said second temperature and returning said fluid at said third temperature to said second storage zone means.

3. Liquid heating apparatus comprising a plurality of separate independent solar liquid heating means, liquid storage zone means having a plurality of liquid storage zones fluidly connected to each other in series and means connecting each of said heating means to a separate storage zone, each of said solar liquid heating means having a different insulating and absorbing construction from the others to operate at different thermal efficiencies and different temperature ranges with the thermal efficiencies increasing in the direction of liquid flow.

4,021,896

DEVICES FOR TYING A LAYER OF THREADS OR SLIVERS

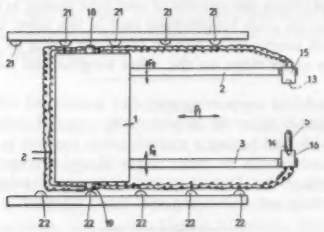
Gerard Stierlein, Mulhouse-Bourtzwiller, France, assignor to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse, France

Filed Sept. 8, 1976, Ser. No. 721,586

Claims priority, application France, Sept. 11, 1975, 75.27834

Int. Cl.² B65H *54/62*

U.S. Cl. 28—1 R **3 Claims**



1. A device for tying a layer of threads or slivers as applicable in particular to the tying of hanks of textile threads on an automatic reeling frame having independent and movable heads, of the type which essentially comprises two arms whose extremities are capable of moving in the same plane on each side of the layer of threads to be tied while undergoing at the same time on the one hand a periodic movement towards and away from each other and on the other hand a forward movement followed by a movement of withdrawal, a shuttle provided with means for gripping the extremity of a tying thread supplied from a reserve bobbin carried by the device, means carried by each of said arm extremities in order to temporarily receive and retain said shuttle, and means for transferring the shuttle from one arm extremity to the other each time said extremities are drawn closer together so as to ensure that the tying thread passes alternately above and beneath the layer of threads while passing through said layer, wherein the means for transferring the shuttle from one arm extremity to the other consist in that the shuttle is of magnetic metal at least at the extremities thereof and each aforesaid extremity of the two arms is fitted with an electromagnet which constitutes said means for temporarily receiving and retaining the corresponding extremity of the shuttle, said electromagnets being energized alternately through electric circuits comprising switches which are actuated in synchronism with the forward and backward movements of said arms.

4,021,897

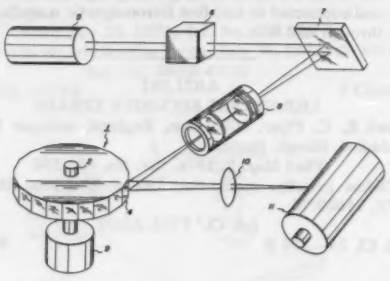
PROCESS FOR PROVIDING CEMENTED GLASS FLATS TO PROVIDE HIGH SPEED MULTI-FACETED POLYGONAL SCANNERS

Tibor Fisli, Los Altos Hills, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed May 19, 1976, Ser. No. 687,848

Int. Cl.² H01J *9/18*

U.S. Cl. 29—25.13 **3 Claims**



1. A process of providing high speed multi-faceted polygonal scanners comprising providing a precisely machined aluminum polygon having a multiplicity of smoothly machined facet faces, applying ultraviolet sensitive cement to at least one face of said polygon, providing precisely prefabricated glass plates which conform to the faces of said polygon to the facet faces of said polygon, placing one of said glass plates on a facet face of the cement coated aluminum polygon, precisely adjusting the angularity of said glass plate, exposing said glass plated polygon to ultraviolet radiation in order to permanently affix the glass plate at the proper angularity and repeating each of the above steps until the polygonal scanner has been completely covered with glass plates at the proper angularity thus providing a high speed multi-faceted polygonal scanner.

4,021,898

METHOD OF ADJUSTING THE FREQUENCY OF VIBRATION OF PIEZOELECTRIC RESONATORS

Alan E. Willis, and Jack Schwarzschild, both of Stamford, Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed May 20, 1976, Ser. No. 688,458

Int. Cl.² H01L *41/22*

U.S. Cl. 29—25.35 **2 Claims**

1. A process for tuning a micro-resonator which is mounted within a hermetically sealed container comprising:

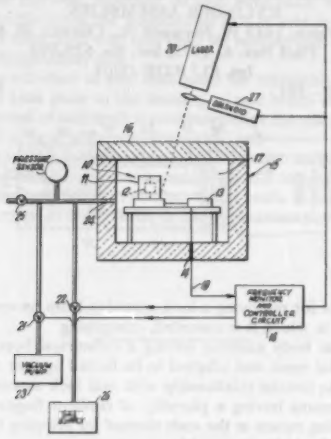
disposing said container within a pressure tight chamber;

operating said micro-resonator as the frequency standard of an oscillator circuit;

providing an opening in said container to permit passage of gas into and out of said container;

varying the ambient gas pressure within said chamber and said container to tune said operating micro-resonator; and

sealing said opening in said container hermetically to main-



tain said micro-resonator under the tuning ambient gas pressure within said container.

4,021,899

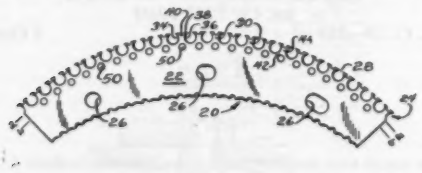
TIRE BUFFING MACHINE BLADES HAVING HEAT DISSIPATION MEANS

Wayne E. Jensen, Homewood, Ill., assignor to B. & J. Manufacturing Company, Glenwood, Ill.

Filed Dec. 12, 1975, Ser. No. 640,201

Int. Cl.² B23D *71/00*; B26D *1/00*

U.S. Cl. 29—79 **19 Claims**



1. A replaceable blade for the rotating hub of a tire buffing machine comprising a sheet metal member having an outer working edge portion and an inner generally planar mounting portion by which the blade is removable fixed to the hub with its outer working edge portion protruding beyond the hub periphery, said working edge portion comprising spaced teeth having leading edges which attack the tire surface in rotation of the hub during operation of the buffing machine to remove material therefrom, said teeth having trailing edges therebehind, and the working edge portion further having openings extending transversely through the blade adjacent the base of the teeth intermediate their leading and trailing edges and outwardly of the inner planar mounting portion of the blade, said openings collecting air in rotation of the hub and enforcing its circulation immediately behind the cutting action of the teeth and across the hub periphery to dissipate heat as it is generated in the teeth and material build up on the hub periphery about the blade teeth in the buffing act.

4,021,900

MILL ROLL MOUNTING

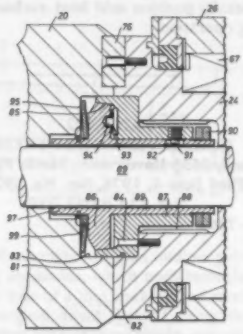
Keith C. Gibson, Kingston; John M. Hookins, Bromley, and Roy R. Oxlade, London, all of England, assignors to British Steel Corporation, London, England

Filed Dec. 18, 1975, Ser. No. 641,951

Claims priority, application United Kingdom, Jan. 17, 1975, 2127/75

Int. Cl.² B21B *31/08*

U.S. Cl. 29—117 **8 Claims**



1. A roll assembly comprising a roll shaft adapted to be driven at one end and having a free end face at the other end, a radially expandable locating spigot fixedly secured to said roll shaft and extending axially outward of the free end face of said shaft, a roll at the free end of said shaft having a central bore extending therethrough and a cylindrical axial recess at one end of said bore surrounding said spigot for cooperation therewith, means responsive to movement of said roll toward the free end of said shaft for expanding said spigot, and releasable means for urging said roll axially against the free end face of the shaft to axially locate the roll relative to the shaft, the arrangement being such that when the roll is urged axially towards the free end face of the shaft, the spigot expands to positively engage the cylindrical surface of the roll recess so as to radially locate the roll to said shaft.

4,021,901

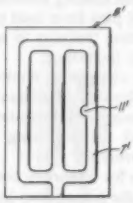
METHOD OF SIZING HEAT EXCHANGE PANELS

Charles A. Kleine, Florissant, Mo., and Verne L. Middleton, East Alton, Ill., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 573,953, May 2, 1975. This application Nov. 17, 1975, Ser. No. 632,645

Int. Cl.² B23P *15/26*

U.S. Cl. 29—157.3 D **7 Claims**



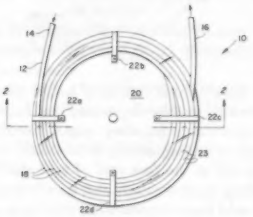
1. A method for the manufacture of hollow articles useful as heat exchangers which comprises providing a first sheet of metal, placing on a surface of said first sheet a weld-inhibiting material in a pattern corresponding to a predetermined configuration of fluid passageways, said pattern including a plurality of longitudinally extending fluid passageways, forming an assembly by superimposing a second sheet of metal upon the

surface of said first sheet bearing said pattern, pressure welding said assembly in the areas thereof not separated by weld-inhibiting material, and expanding said assembly in the areas separated by said weld-inhibiting material by the introduction of pressure therein, wherein the weld-inhibiting pattern provided is of such configuration that a marker structure comprising a distension associated with one of said longitudinally extending passageways is formed when said assembly is expanded, said marker structure is situated so as to provide guidance for the determination of the final linear dimensions of the article and utilizing said marker structure to longitudinally and laterally position said heat exchanger for a subsequent cutting operation.

4,021,902
COILED VIBRATORY FEEDER

Max G. Roland, 3535 Haven Ave., Menlo Park, Calif. 94025

Filed June 4, 1976, Ser. No. 692,871
Int. Cl.² B23Q 7/10
U.S. Cl. 29—786 14 Claims



1. A vibratory feeder for individually feeding workpieces comprising:

means defining a elongated enclosed tubular passageway arranged as a plurality of generally concentric coil turns, said tubular passageway including a charging end and a discharging end for receiving and discharging workpieces, respectively;

connecting means for integrally connecting substantially all of said turns of the passageway to each other so as to form an essentially rigid, integral body which includes said turns; and

means for connecting said body to a vibrating means for vibrating said body asymmetrically about an axis, the workpieces being movable through the passageway about said axis by the asymmetric vibrations from the charging end to the discharging end and discharged individually therefrom.

11. In combination with a tumbler lock pin setting machine and a tumbler lock pin making machine, a vibratory feeder for storing a plurality of pins from said pin making machine and for individually feeding the pins to said pin setting machine, said vibratory feeder including:

means defining a elongated, enclosed tubular passageway arranged as a plurality of generally concentric coil turns, and tubular passageway including a charging end and a discharging end for receiving and discharging workpieces, respectively;

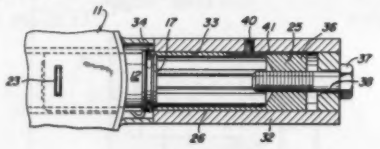
connecting means for integrally connecting substantially all of said turns of the passageway to each other so as to form an essentially rigid integral body which includes said turns; and

means for connecting said body to a vibrating means for vibrating said body asymmetrically about an axis, the workpieces being movable through the passageway about said axis by the asymmetric vibrations from the charging end to the discharging end and discharged individually therefrom.

4,021,903
METHOD AND TOOL FOR REMOVING LOCK CYLINDER ASSEMBLIES

Richard Walsh, 1443 W. Norwood St., Chicago, Ill. 60660

Filed Nov. 6, 1975, Ser. No. 629,590
Int. Cl.² B23P 19/04
U.S. Cl. 29—261 5 Claims



1. A tool for removing a lock assembly from an opening in a support in which it is mounted, comprising

a tubular body member having a cylindrical bore and an annular open end adapted to be butted against said support in coaxial relationship with said lock assembly,

collet means having a plurality of resilient fingers having gripping means at the ends thereof for gripping the outer end of said lock assembly,

said collet means being slidably received in said body member for movement from a position wherein said fingers extend outwardly through said opening and a position entirely within said body member.,

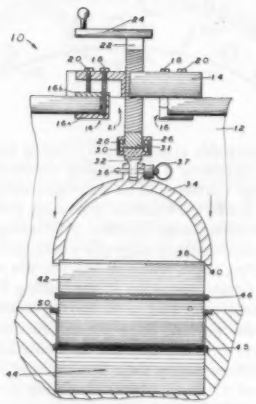
screw means for drawing said collet means into said body member to retract said lock cylinder from said support when said gripping means are in gripping engagement therewith, and

a thin annular flange having an internal cylindrical surface coextensive with said cylindrical bore and extending outwardly from said annular open end of said body member for insertion into said opening in said support around the ends of said fingers to hold said gripping means against said lock cylinder while said gripping means are within said support.

4,021,904
ASSEMBLY AND METHOD FOR DRIVING AND WITHDRAWING DISC BRAKE PISTON

Guy R. Constant, 146-32 224 St., Rosedale, N.Y. 11422

Filed May 25, 1976, Ser. No. 689,742
Int. Cl.² B23P 19/04
U.S. Cl. 29—263 9 Claims



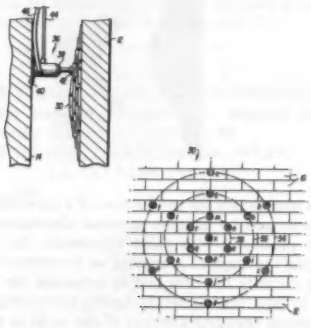
1. An assembly for manually inserting and for withdrawing a piston component of a disc brake assembly, which comprises;

a base plate;
a shaft movably mounted on said base plate so as to be movable along the longitudinal axis of said shaft;
means associated with said shaft for moving said shaft along its longitudinal axis;
means attached to said base plate for releasably mounting said base plate to the housing of said brake assembly so one end of said shaft is positioned over the piston cylinder and in axial alignment therewith; and
an endpiece connected to said end, said endpiece being adapted to engage with said piston and to hold it in axial alignment with the cylinder of said brake housing, during insertion or withdrawal of said piston component.

4,021,905
METHOD OF STRAIGHTENING FLUE WALLS IN A CARBON ANODE RING FURNACE

Charles M. Benton, Hawesville; Paul Cox, Jr., Owensboro, both of Ky.; Paul M. Sprinkle, Tell City, Ind., and Frank John Nowak, Owensboro, Ky., assignors to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.

Filed Apr. 21, 1976, Ser. No. 679,041
Int. Cl.² B23P *7/00*
U.S. Cl. 29—401 R **11 Claims**

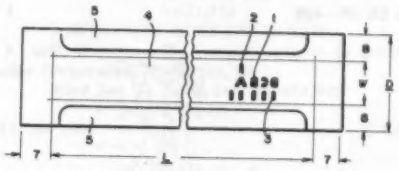


1. A method of straightening a deformation zone in one wall of a pair of spaced vertical walls formed of refractory brick, comprising the steps of:
providing a jack means having oppositely disposed first and second reaction surfaces for applying oppositely directed forces;
inserting the jack means between the walls into successive preselected positions in a substantially circular path about the deformation zone with the first and second reaction surfaces of the jack means in confronting relation with a respective one of the walls, said positions being selected so as to minimize the forces required to reduce the deformation zone;
extending the jack means in each of said positions to cause engagement of the first and second reaction surfaces with the walls; and
applying controlled, oppositely directed forces to the walls at each of said preselected positions by further extension of the jack means to thereby reduce the deformation zone.

4,021,906
METHOD OF MANUFACTURING AN ENDLESS PRINTING BELT FOR A BELT TYPE PRINTING APPARATUS

Soroku Takahashi, Tokyo, Japan, assignor to Kyuroku Kabushiki-Kaisha, Tokyo, Japan

Continuation of Ser. No. 596,860, July 17, 1975, abandoned. This application June 11, 1976, Ser. No. 695,011
Claims priority, application Japan, July 20, 1974, 49-83666
Int. Cl.² B23Q *17/00*
U.S. Cl. 29—407 **4 Claims**

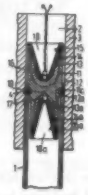


4. A method of manufacturing an endless printing belt for belt type printing apparatus, which comprises the steps of
forming on one side of a thin heat-treated steel sheet material, with marginal zones formed along the four sides thereof, printing types, timing marks, sprockets and non-etched zones by a photo-etching process, said non-etched zones being located in the transverse marginal zones,
subjecting the reverse side surface of the sheet material to a slight degree of photoetching,
heating the sheet material,
perforating the non-etched zones with reference openings to be used for welding and trimming operations,
removing the longitudinal end portions of the sheet,
grinding the end edges of the sheet,
securing the end edges together with the type surfaces facing outwardly,
welding the secured edges of the sheet material,
annealing the welded zone after completion of the welding,
removing the transverse edge portions of the sheet, and
finishing the type faces.

4,021,907
METHOD OF SEALING APERTURES IN TUBE PLATES OF HEAT EXCHANGERS USING EXPLOSIVE PLUG

Nicolaas Abraham Zondag, Roosendaal, Netherlands, assignor to Explosive Metal Working Holland B.V., Roosendaal, Netherlands

Filed Feb. 27, 1976, Ser. No. 662,045
Claims priority, application Netherlands, Sept. 16, 1974, 7412274
Int. Cl.² B23P *17/02*
U.S. Cl. 29—421 E **6 Claims**



1. The method of sealing an aperture in a tube plate in the place, where a tube of a heat exchanger extends with an end portion in a boring of said plate, by means of a hollow metal plug containing locally explosive material and firing means, said method comprising the steps of inserting into the respective aperture of the tube plate a plug having two coaxial cavi-

ties separated from one another by a partition, each one of said cavities opening towards an individual end of the plug and containing an explosive charge with a firing means, and thereupon of firing the two charges of the plug almost simultaneously.

4,021,908

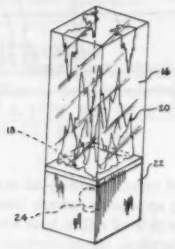
METHOD OF SCULPTURING WITH PLASTIC MATERIAL

Mildred Shulman, 15 Charles St., New York, N.Y. 10014

Division of Ser. No. 459,532, April 10, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,308

Int. Cl.² B23P *11/00*

U.S. Cl. 29—428 **1 Claim**



1. A method of sculpturing in a pre-molded, solid plastic form comprising drilling a plurality of pilot holes in one end of said plastic from, chipping and cracking said internal holes whereby said holes merge or semi-merge in order to form an internal sculpture with said one being at least partially open, and placing the open end of said sculpture on top of a lighted light transmitting base whereby the fractured internal holes and interior of the plastic from are irradiated.

4,021,909

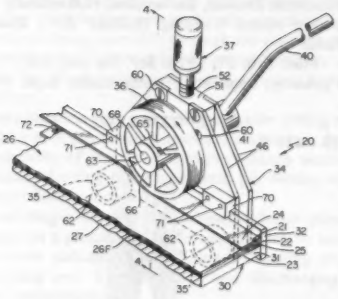
HAND PORTABLE DEVICE FOR FASTENING A HOLDING BAR ON A PRINTING BLANKET AND METHOD OF FASTENING SAME

Jacob A. Bollmer, Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Feb. 13, 1976, Ser. No. 657,912

Int. Cl.² B23P *11/00;* **B25B** *25/00, 27/02*

U.S. Cl. 29—432.1 **17 Claims**



1. A hand portable device for fastening a holding bar on a printing blanket; said holding bar having a bight and a pair of legs diverging from opposite ends of said bight; said device comprising, a frame structure, a backup roller rotatably mounted on said frame structure, a pressure roller carried by said frame structure for rotation relative thereto and in spaced relation from said backup roller, an adjustable stop means for controlling the maximum spacing between said pressure roller and backup roller, a carrier supporting said pressure roller, means supporting said carrier and pressure roller for sliding movement toward and away from said backup roller, horizontal support means mounted on said frame structure for supporting said printing blanket and holding bar, and means for relatively moving said device and bar with said pressure roller relatively urging said legs toward each other with an end portion of said blanket disposed between said legs to thereby progressively deform at least one of said legs along its entire length into clamping engagement against said end portion of said blanket.

4,021,910

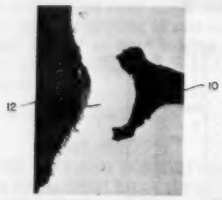
METHOD FOR TREATING SUPERALLOY CASTINGS

William R. Freeman, Jr., North Muskegon, and Louis E. Dardi, Muskegon, both of shall Islands, assignors to Howmet Turbine Components Corporation, Greenwich, Conn.

Continuation-in-part of Ser. No. 485,496, July 3, 1974, abandoned. This application Apr. 14, 1976, Ser. No. 676,857

Int. Cl.² B22D *11/126*

U.S. Cl. 29—526.2 **8 Claims**



1. In a method for the production of a superalloy part which is characterized by specific nominal dimensions and which must be produced with close tolerances, the improvement comprising the steps of preparing an investment casting mold defining a cavity dimensioned to minimize the need for machining to final dimensions, including nucleating agents in the molten metal engaging surfaces of the mold to promote rapid nucleation and freezing of said metal, pouring molten metal of said superalloy composition into said mold, and solidifying the molten metal in said mold, the solidified casting portions adjacent said molten metal engaging surfaces comprising a sound, substantially continuous skin, and wherein defects in the form of material voids are located immediately beneath the skin, locating the casting in a chamber subsequent to complete solidification thereof and without any surface finishing operations whereby said skin remains intact, introducing a surrounding gaseous atmosphere into the chamber, applying pressure to the casting through the atmosphere between about 10,000 psi and 50,000 psi, heating the casting to an elevated temperature, said skin being of sufficient thickness to substantially prevent the penetration of said gas into said voids, said casting being at said temperature for a period of time during application of said pressure sufficient to permit metal movement in the casting when the casting is subjected to said pressure, the combination of heat, pressure and time serving to achieve said metal movement and to substantially eliminate said voids by deforming and consolidating the material in the area of said voids, and thereafter subjecting said casting to a

finishing operation which removes only the nonmetallic components on the part surfaces including mold material, any superfluous gate and runner portions, and only that additional amount of metallic material necessary to assure complete removal of said nonmetallic components.

4,021,911

METHOD FOR PRODUCING AN IRON ELECTRODE FOR AN ALKALINE ACCUMULATOR

Viktor Evmenievich Kononenko; Nina Stepanovna Kononenko, both of poselok "Akkumulyator", 31, kv. 7; Valentina Nikolaevna Tamazina, ulitsa Radischeva, 71/1, kv. 20; Valentina Nikolaevna Baranova, ulitsa Dzerzhinskogo, 88, kv. 12; Viktor Andreevich Gaintsev, ulitsa Lenina, 108, kv. 7; Alexandr Jurievich Kuzin, poselok "Akkumulyator", 30, kv. 16; Gennady Ivanovich Pankov, ulitsa Mirnaya, 2, kv. 48, all of Kursk; Boris Isaakovich Fishman, ulitsa Tikhoretsky prospekt, 9, korpus 7, kv. 70, and Tamara Konstantinovna Teplinskaya, prospekt Kosmonavtov, 20, korpus 2, kv. 59, both of Leningrad, all of U.S.S.R.

Filed Jan. 7, 1976, Ser. No. 647,459

Int. Cl.² H01M *4/04*

U.S. Cl. 29—623.5 **6 Claims**

1. A method for producing an iron electrode of an alkaline accumulator comprising the steps of introducing into an active mass, which comprises black iron ore concentrate, iron oxide, synthetic fiber, ferrous sulphide and an aqueous solution of nickel sulphate, an aqueous solution of surface-active compounds in an amount of 3 to 20 weight parts with respect to the weight of the dry components of the active mass; pressing the mixture into a steel-band grid and drying for a period of time from about 5 minutes to about 10 minutes at a temperature range of from about 150° to about 300° C; treating the electrode thus produced with a binder, said binder being a suspension of lithium hydroxide in a 20% solution epoxide resin and a hardener; drying the electrode for a period of time of from about 10 minutes to about 30 minutes at a temperature range of from about 70° to about 160° C.

4,021,912

TIRE TRIMMER AND BLADES THEREFOR

Charles Keith Stanfield, Matteson, Ill., assignor to B. & J. Manufacturing Company, Glenwood, Ill.

Filed July 11, 1975, Ser. No. 595,292

Int. Cl.² B26B *3/00*, *9/02*

U.S. Cl. 30—280 **11 Claims**

1. Tire trimming tool useful to remove mold protuberances or flash from a tire comprising an elongate handle having a pair of blade holding rods with slotted ends in which are received the ends of a metal blade positioned between said rods, the blade between its mounted ends embodying generally straight and parallel raised ridges having outwardly displaced sidewalls and intervening narrow webs therebetween, the ridges including their sidewalls and the webs extending in a direction generally axially of the handle, and the forward end of the blade having recesses between the ridges such that the leading edge of the webs trail the forward end of the ridges, the underside of the web leading edges being sharpened and the underedge of the portion of the ridges leading the web leading edge sloping rearwardly to the spaced-therebehind sharpened leading edge of the webs between the raised ridges which ride on the tire surface in use of the tool to catch and wedge mold protuberances or tips of the tire carcass for shearing by the sharpened leading edge of the webs, the forward end of the ridges being bluntly disposed and spaced above the sharpened underside of the web leading edges to avoid digging into the tire surface during use of the tool, and the underside of the ridges being disposed above the webs along their full length to provide clearance paths therebeneath and to either side of the webs through which mold protuberances or flash missed by the recesses are free to pass without raising the webs of the blade off the tire carcass surface.

4,021,913

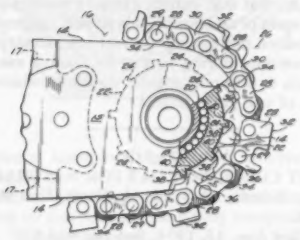
SPROCKET NOSE CHAIN SAW

Uwe F. Arff, Peterborough, Canada, assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Jan. 22, 1976, Ser. No. 651,409

Int. Cl.² B27B *17/04*

U.S. Cl. 30—384 **8 Claims**



1. A chain saw comprising an elongated cutter bar having, at the outer edges thereof, laterally spaced side rails, said cutter bar also having a curved end portion including laterally spaced side plates and a journalled idler wheel with a peripheral outer surface extending between said side plates and having a plurality of spaced outwardly extending lobes, and an endless saw chain trained around said cutter bar and having pivotally connected side and center links, each of said side links having a bottom surface which, during semicircular traversal of said curved end portion, engages and is partially supported by one of said side plates of said curved end portion, each of said center links having a lower portion which includes a forward edge extending inwardly between said side plates with at least one of said forward edges being in contact with one of said lobes to insure rotation of said idler wheel during chain traversal around said curved end portion, each of said lower portions also having a bottom edge which, when unworn and during semicircular traversal of said curved end portion, engages said peripheral outer surface of said idler wheel to provide partial support for said side links engaging said side plates of said curved end portion.

4,021,914

GUIDE HANDLE FOR POWER TOOLS

Gottfried Leibundgut, Solothurn, and René Joerg, Luterbach, both of Switzerland, assignors to Scintilla A.G., Solothurn, Switzerland

Filed Apr. 12, 1976, Ser. No. 675,809

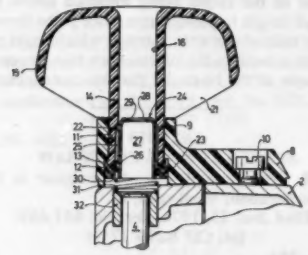
Claims priority, application Switzerland, Apr. 30, 1975, 139105/75

Int. Cl.² B27B *19/09*

U.S. Cl. 30—392 **14 Claims**

1. In a power tool, particularly a cutting tool, a combination comprising an elongated cutting element reciprocable in direction of its longitudinal axis; a housing having an upper, a lower and an end portion formed with an elongated bore which extends along said axis downwardly from said upper portion towards said lower portion, said housing also having a hand-held portion for turning said housing about said longitu-

dinal axis; a guide handle having a hand-held head portion mounted at said upper portion of said housing, and an elongated shaft portion received in and mounted for turning movement relative to said bore in either circumferential direction of said axis; and means for mounting said cutting element on



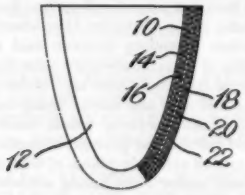
said housing so that said cutting element participates in the turning movement of said housing about said longitudinal axis, to thereby position said cutting element in a plurality of different cutting positions during cutting by turning said housing about said axis to different angular positions relative to said shaft portion of said guide handle.

4,021,915

PERMANENT COLORING COAT FOR NATURAL TEETH

Harry Ernest Rubens, 14 Brookside Court, East Brunswick, N.J. 08816

Filed Aug. 13, 1974, Ser. No. 488,527
Int. Cl.² A61K *5/02*
U.S. Cl. 32—15 **1 Claim**



1. A method of restoring a discolored surface of a natural tooth to its original color, which comprises applying a layer of glue to the entire buccal surface of the tooth, and applying to said glued surface immediately thereafter, by blowing, a thin layer of dry powdered colored particles, at ambient temperatures, having a thickness not substantially greater than the thickness of a single particle, forming an entirely new surface over the buccal area in the original color of the tooth, said glue characterized by being sufficient tenacious to adhere to both the tooth and the powdered particles and to resist removal except by wear of the powdered particles, resistant to mouth liquids, non-toxic, being a liquid when applied, whereby the glue will set immediately upon contact with the powdered particles, to limit the thickness of the layer of particles to a single particle thickness on the surface of the glue.

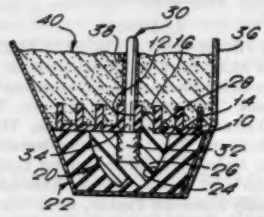
4,021,916

DENTAL DOWEL PIN POSITIONER

Robert Spalten, 745 Fifth Ave., New York, N.Y. 10022

Filed Aug. 20, 1975, Ser. No. 606,323
Int. Cl.² A61C *13/00*
U.S. Cl. 32—11 **7 Claims**

1. In a dental appliance for maintaining axis parallelism of dental dowel pins when positioning replicas of the teeth taken from impressions in a model of the patient's mouth, the combination of dowel pins and a positioning means having a plurality of apertured seats for mounting the dowel pins therethrough in positions conforming to the configuration of the patient's teeth; and apertured means for maintaining axis



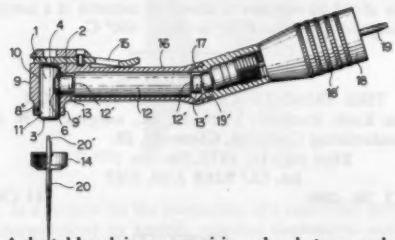
parallelism of the dowel pins to each other; and means for seating each dowel pin in the longitudinal axis of a replica; said apertured seats being mounted to each other in predetermined transverse relationships to provide a connected unitary structure at all times.

4,021,917

DENTAL HANDPIECE AND A CARTRIDGE FOR A HEAD THEREOF

Toshimasa Nakanishi, Kanuma, Japan, assignor to Nakanishi Dental Mfg., Co., Ltd., Kanuma, Japan

Filed Feb. 20, 1975, Ser. No. 551,406
Int. Cl.² A61C *1/12*
U.S. Cl. 32—27 **2 Claims**



1. A dental handpiece comprising a head at one end and an engaging screw thread at another end, said head extending at substantially a right angle to said handpiece, said engaging screw thread being disposed around a wall adjacent a partially bent end portion of said handpiece, said head being provided with a hollow vertically communicating with a hollow of said handpiece, a semispherical groove cut in the wall longitudinally and partially adjacent an orifice of said head, and a screw thread provided around and adjacent said orifice, respectively, a driving shaft rotatably mounted in an intermediate bushing which is adapted to be securely disposed within the dental handpiece, said driving shaft being provided with gears at each end, one gear being located adjacent an inner orifice communicating with the hollow of the head and another gear being located adjacent an outer orifice of the handpiece, said engaging screw thread of the handpiece being adapted to connect to a coupling tube, a cartridge which is adapted for insertion into the hollow of the head so as to secure a reamer into said head, said cartridge having an elongated opening cut through the wall thereof at its midportion and a small opening provided through the wall thereof near an lower orifice thereof adapted to correspond to the semispherical groove, said cartridge including two metal bearings securely disposed in the lower and upper orifices respectively, said lower metal bearing being provided with a semispherical cavity at a portion corresponding to the small opening of the cartridge, a

bushing rotatably inserted into the cartridge through these metal bearings, said bushing having a stopper near an upper end thereof and a gear secure at a position that said gear is adapted to open out into the elongated opening of the cartridge for permitting the driven gear of the bushing to engage with the driving gear of the driving shaft through the elongated opening of the cartridge, and an end portion of a wall adjacent the upper orifice of said bushing being partially projected to form a flat stopper for securing a reamer.

4,021,918

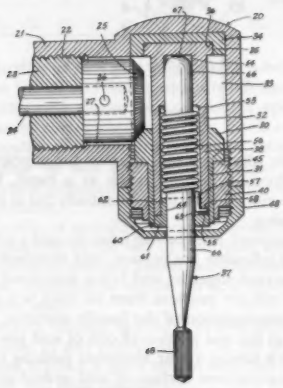
SPRING CLUTCH DENTAL HANDPIECE

Ronald L. Bailey, St. Peters, Mo., assignor to Young Dental Manufacturing Company, Hazelwood, Mo.

Filed May 15, 1975, Ser. No. 577,708

Int. Cl.² A61C *1/10*

U.S. Cl. 32—27 **15 Claims**



1. In a dental handpiece for use with a rotary dental instrument having a cylindrical shank of uniform diameter: a housing having a cavity extending thereinto through an opening in a wall thereof; an instrument tube rotatably mounted in the housing and having an open end and a closed end, the tube being disposed to present its open end toward the opening of the housing whereby an instrument may be inserted through the opening of the housing and into the tube; bearing means in the housing to rotatably engage the tube at spaced points therealong; drive means in the housing to rotate the tube in said bearing means; the instrument tube having a reduced inside diameter adjacent its closed end to receive and snugly hold an instrument, and a larger inside diameter below that reduced diameter; a spiral spring in the larger inside diameter portion having a normal uniform inside diameter over an extended axial part of the spring that is slightly less than the outside diameter of the shank; means to secure the end of the spring inside the tube toward the open end thereof, its other end extending inwardly of the tube and lying within the tube, the spring terminating short of the closed end of the tube, whereby the instrument shank can be projected through the spring and be received in the said closed end of the tube, the spiral spring comprising means to grip the shank throughout the axial distance of uniform inside diameter to hold the instrument in the tube when the drive means is inoperative, and being adapted to grip the shank throughout the said axial distance when the tube is rotated in one direction; a member adjacent the open end of the tube having an opening to receive and stabilize the shank of the instrument.

4,021,919

DENTAL HANDPIECE OPERABLE BY COMPRESSED AIR

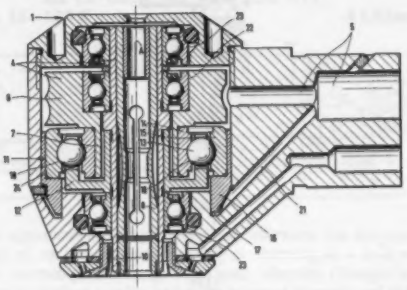
Bernhard Lingenhöle, Biberach an der Riss, Germany, and Richard R. Stephens, Brisbane, Australia, assignors to Kaltenbach & Voigt, Biberach an der Riss, Germany

Filed May 6, 1976, Ser. No. 683,945

Claims priority, application Germany, May 13, 1975, 2521314

Int. Cl.² A61K *5/02*

U.S. Cl. 32—27 **12 Claims**



1. A dental handpiece operable by compressed air and comprising;

a turbine rotor forming a first drive element;

a driving air line arranged to supply compressed air to the rotor to drive the latter;

a second drive element coupled with said rotor and arranged for holding a dental instrument in order to drive the latter when the second element is driven by the rotor;

a planetary trnasmission coupling together the first and second drive elements, said transmission comprising an outer ring, an inner ring, and balls locatec between and frictionally engageable with said inner and outer rings; said balls being in drive transmitting relationship with one of said drive elements, and a first of said rings being non-rotatably mounted in the handpiece and a second of said rings being coupled with the other of said drive elements for rotation therewith; and one of said rings being mounted for axial movement in the handpiece relative to the other ring in order to increase the radial load applied between the rings through the intermediary of the balls so as to increase the torque transmissible by the planetary transmission;

an adjustment member moveably mounted for engagement with said one ring in order to move the latter axially;

and a chamber defined in the handpiece, on one side of said adjustment member, for effecting movement of the adjustment member with consequential axial movement of said one ring so as to increase the torque transmissible by the planetary transmission when compressed air is supplied to said chamber.

4,021,920

DRILLING OR MILLING APPARATUS FOR THE WORKING OF LIVE BONE, PARTICULARLY FOR DENTISTRY

Horst Kirschner, Wilhelmstrasse 56, D-63 Giessen, and Wolfgang Meyer, Heerstrasse 18, D-3569 Erdhausen, both of Germany

Continuation-in-part of Ser. No. 478,586, June 12, 1974, abandoned. This application Mar. 13, 1975, Ser. No. 558,075

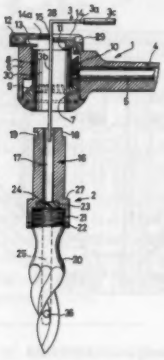
Claims priority, application Germany, June 18, 1973, 2331023

Int. Cl.² A61C *1/08*

U.S. Cl. 32—28 **18 Claims**

1. In a hand held apparatus including a handle having driv-

ing shaft means rotatably supported thereon and tool means rotatably driven by said driving shaft means, said driving shaft means including means thereon defining a passageway extending coaxially therethrough, the improvement comprising tube means extending through said passageway means for carrying a fluid therethrough, said tube means being smaller in size than said passageway means to define a clearance space therebetween, said tool means having a work end and means defining a longitudinal channel therein communicating with said work end;



resilient seal means separate from said tool means at the end of said longitudinal channel means remote from said work end; and

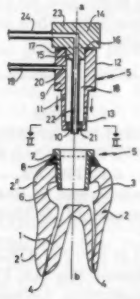
coupling means for coupling said tool means to said driving shaft means, said tube means extending into said longitudinal passageway means, the exterior of said tube means and the end of said tool means remote from said work end being tightly engaged with said resilient seal means to seal said longitudinal channel means adjacent the end thereof remote from said working end of said tool means from said passageway means in said driving shaft means.

4,021,921

DEVICE FOR TREATING THE PULP-CANALS OF A TOOTH

Louis J. Detaille, Chaussee de Dinant, 119, B-5150 Wepion, Belgium

Filed Oct. 17, 1975, Ser. No. 623,219
Claims priority, application Belgium, Oct. 18, 1974, 44786
Int. Cl.² A61C *3/00*
U.S. Cl. 32—40 R **23 Claims**



1. A device for treating the pulp-canals and -chamber of a tooth, the crown of which presents a previously opened pulp-chamber in which said canals open, said device comprising:

an apparatus tightly adaptable to the crown of the tooth and closing the pulp-chamber,

means for circulating a treating solution into the pulp-chamber and the pulp-canals, said treating solution acting substantially upon the vasculo-nervous bundle or the necrotic magma of the tooth,

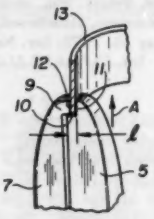
means for subjecting the pressure of the treating solution within the pulp-chamber and the pulp-canals to periodical impulses combined with oscillations of substantially higher frequency.

4,021,922

ORTHODONTIC PLIER-TYPE TOOL

Louis Goldberg, 68 Lincoln Terrace, Harrington Park, N.J. 07640

Filed June 7, 1976, Ser. No. 693,521
Int. Cl.² A61C *7/00*
U.S. Cl. 32—66 **10 Claims**



1. An orthodontic plier-type tool adapted for gripping and pushing an orthodontic appliance, such as a band, having opposed surface portions which are substantially flat in at least one plane, comprising:

a pair of plier members, each having a handle and a substantially rigid and inflexible jaw portion, said members being pivotally connected together and being selectively movable to move said jaw portions from an open to a closed condition by manipulation of the handle portions;

a notch formed at the end portion of one of said jaw members, said notch having a rear abutment pushing surface for engaging against one surface of said orthodontic appliance, and a side surface for engaging over substantially the complete extent thereof a portion of one of said opposed flat surfaces of said orthodontic appliance; and

the other of said jaws having a protruding surface portion opposite said side surface of said notch and engageable in said notch when the jaws are closed, said protruding surface portion engaging over substantially the complete extent thereof the other of said opposed flat surfaces of said orthodontic appliance;

said jaws, when closed on said orthodontic appliance, engaging said orthodontic appliance on three surfaces of said jaws to enable positive gripping and pushing of said orthodontic appliance substantially without slippage relative to said jaws.

4,021,923

METRIC UNIT CONVERSION AID

Devora Feldman, 245 Balclutha, Corte Madera, Calif. 94925

Filed Jan. 14, 1976, Ser. No. 648,956
Int. Cl.² G09B *19/02;* **G06G** *1/00*
U.S. Cl. 33—1 B **3 Claims**

1. A template comprising:

a substrate;

a plurality of indicia designating sequential metric units and defining a plurality of columns on said substrate, said metric units including the following in the indicated sequence, mega 10^6, 10^5, 10^4, kilo 10^3, hecto 10^2, deka 10^1, unit 10^0, deci 10^{-1}, centi 10^{-2}, milli 10^{-3}, 10^{-4}, 10^{-5}, and micron 10^{-6}, and said first row is annotated, liter, gram,

meter, said second row is annotated square meter, and said third row is annotated cubic meter;

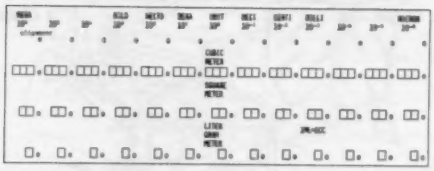
a plurality of substantially circular first aperture means in said substrate for writing a single dot therethrough positioned at the right edge of each of said column;

a plurality of substantially rectangular second aperture means in said substrate positioned to the left of said first aperture means in said columns for writing a single digit therethrough;

said first and second aperture means forming a first horizontal row of alternate second and first aperture means;

a plurality of third apertures in said substrate dimensioned similar to said first aperture means and positioned above each of said first aperture means;

a plurality of fourth apertures in said substrate positioned at the left of each of said third apertures and dimensioned similar to said second aperture means;



a plurality of fifth apertures in said substrate positioned to the left of said fourth apertures in said columns and dimensioned similar to said fourth apertures forming a second row of alternately fifth, fourth and third apertures;

a plurality of sixth apertures in said substrate dimensioned similar to said first aperture means and positioned in vertical alignment with said first aperture means and third apertures;

a plurality of seventh and eighth apertures in said substrate positioned to the left of said sixth apertures in vertical alignment with said fourth and fifth apertures respectively and dimensioned similar to said fourth and fifth apertures; and

a plurality of ninth apertures in said substrate dimensioned similar to and positioned to the left of said eighth apertures forming a third row of alternate ninth, eighth, seventh and sixth apertures.

4,021,924

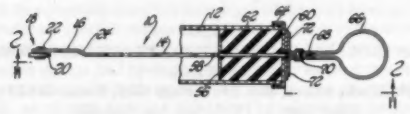
DIP STICK

Walter E. Haines, Bloomfield Hills, Mich., assignor to Estan Manufacturing Company, Troy, Mich.

Filed July 23, 1975, Ser. No. 598,326

Int. Cl.² G01F *23/04*

U.S. Cl. 33—126.7 R **14 Claims**



1. A fluid-level indicating device adapted for insertion into the access tube of a fluid reservoir wherein the access tube has one or more bends, the device comprising: an elongated, flexible measuring member, said member including a surface near one end thereof for receiving fluid-level-measuring indicia and friction reducing means mounted on the leading end of said measuring member; said friction reducing means having a dimension greater than the width of said measuring member to hold the leading end of said measuring member away from the walls of the access tube to prevent binding of the leading end with the walls of the access tube thereby facilitating free passage of said measuring member through the access tube.

4,021,925

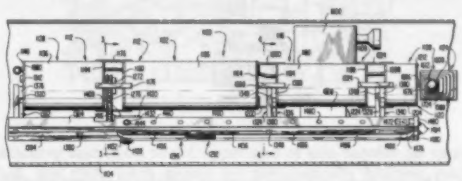
APPARATUS FOR AND PROCESS OF DETERMINING THE INTERNAL DIAMETER OF PIPELINES

William F. Loftus, 78a Ridge Road, Valley Cottage, N.Y. 10989

Continuation-in-part of Ser. No. 481,475, June 20, 1974, Pat. No. 3,939,570. This application May 2, 1975, Ser. No. 574,038

Int. Cl.² G01B *5/12, 7/28, 5/20, 7/12*

U.S. Cl. 33—178 E **4 Claims**



1. An apparatus for determining and indicating the internal diameter of, or internal wear, pitting or thinning in a hollow pipeline, normally located underground, whereby changes in the internal surface configuration or internal diameter of the pipeline at various points along its length are measured, comprising:

a. a body member;

b. a linear potentiometer having a shaft with a ball bearing mounted for universal movement on an end thereof, said linear potentiometer producing an output signal representative of the distance of a straight line extending from the longitudinal axis of said apparatus to the internal surface of the pipeline in a predetermined radial direction at a predetermined point along the length of the pipeline;

c. a rotatable sensing unit in which is mounted said linear potentiometer, said sensing unit being rotatably attached to said body member;

d. a solenoid connected to said shaft such that said solenoid urges said ball bearing against the internal wall of the pipeline when said solenoid is inactivated and retracts the ball bearing from contact with the internal wall when said solenoid is inactivated.

e. a first motor attached to said body member and connected to said rotatable sensing unit so as to rotate said sensing unit;

f. a second motor attached to said body member;

g. at least two motor driven drive belts which engage the internal wall of said pipeline and are attached to said body member; and

h. means to transmit power from said second motor to said motor driven drive belts so as to propel said body member along the hollow pipeline.

4,021,926

SECONDARY SIDE MOUNTED GUNSIGHT AND ARRANGEMENT, FOR AUXILIARY USE WITH A PRIMARY TOP MOUNTED TELESCOPIC RIFLE SIGHT

Matthew James Hrebar, Box C, Beaverdale, Pa. 15921

Continuation-in-part of Ser. No. 550,424, Feb. 18, 1975, Pat. No. 3,961,423. This application Nov. 17, 1975, Ser. No. 632,680

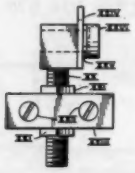
The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.

Int. Cl.² F41G *1/02, 1/16, 1/38, 11/00*

U.S. Cl. 33—258 **2 Claims**

1. A gunsight comprising: a front sight assembly, said front sight assembly having support means including an elongated, round, threaded horizontal sight support standard flattened on one end and having bead sighting elements mounted on said one end, and a front sight ramp attached to the top front end

of the gun barrel, said front sight ramp having a horizontal hole drilled and tapped there through to receive said round threaded horizontal sight support standard, said bead sighting elements extending to one side of said gun barrel, when said standard is received in said hole, said bead sighting elements being adjustable for windage by screwing said round threaded horizontal sight support standard into or out of the threaded hole in said front sight ramp; a rear sight assembly, said rear sight assembly support means including or elongated round threaded vertical sight support standard squared on one end



and having open and peep aperture sighting elements attached thereto, and a mounting block for attachment to the side of the gun receiver, said mounting block having a vertical hole drilled and tapped there through to receive said round threaded vertical sight support standard thus holding said open and peep aperture sighting elements to one side of said gun receiver, when said vertical standard is received in said vertical hole, said open and peep aperture sighting elements being adjustable for elevation by screwing said round threaded vertical sight support standard up or down in the threaded vertical hole in said mounting block.

4,021,927

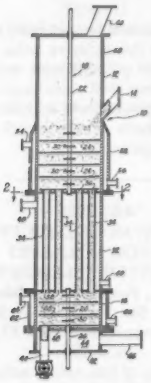
PROCESS FOR FLUIDIZATION

Leo R. Idaszak, Palos Heights, Ill., assignor to CPC International Inc., Englewood Cliffs, N.J.

Continuation-in-part of Ser. No. 526,784, Nov. 25, 1974, Pat. No. 3,967,975, and a continuation-in-part of Ser. No. 573,604, April 30, 1975, abandoned. This application Nov. 21, 1975, Ser. No. 634,208

Int. Cl.² F26B *3/08*

U.S. Cl. 34—10 **53 Claims**



1. A fluidization process for fluidizing solids comprising the steps of

a. simultaneously feeding solids to an upper fluidized zone while continuously subjecting the solids in the upper fluidized zone to mechanical agitation,

b. passing the agitated, fluidized solids in the upper fluidized zone downwardly against the fluidizing gas through a plurality of tubular fluidized zones into a lower fluidized zone while mechanically agitating the solids in the lower fluidized zone, and

c. contacting the tubular zones with heat exchange media to effect heat transfer with the solids fluidized in the tubular fluidized zones.

4,021,928

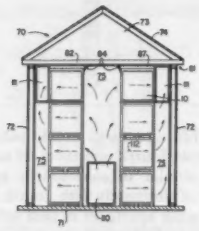
CROSS-FLOW MODULAR TOBACCO CURING SYSTEM

William Hugh Johnson, Raleigh, N.C., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 425,848, Dec. 18, 1973, Pat. No. 3,932,946, which is a continuation of Ser. No. 288,028, Sept. 11, 1972, abandoned. This application Nov. 25, 1975, Ser. No. 635,085

Int. Cl.² F26B *3/00, 25/06*

U.S. Cl. 34—38 **4 Claims**



1. A method of curing or drying tobacco comprising;

a. placing tobacco to be cured in a container of rectangular solid configuration having gas impervious top and bottom walls, a pair of opposed generally impervious side walls and a pair of gas pervious opposed side walls;

b. supporting the tobacco in the containers by passing a plurality of rods therethrough with the axes of the rods parallel to the plane of the top and bottom walls;

c. stacking a plurality of the containers in a curing barn in at least one row with the row being spaced from a pair of opposed side walls of the barn to define a pair of isolated chambers between the opposed side walls of the barn and the air pervious side walls of the containers, and the chambers being generally coextensive with the row of containers;

d. directing a curing of drying gas stream into one of the isolated chambers; and

e. withdrawing gas from the other of the isolated chambers whereby the curing gas stream flows generally horizontally and uniformly through the tobacco maintained in the containers of the row.

4,021,929

CONTROLLED CROP DRYING ATTACHMENT FOR COMBINE

Glen N. Black, Rte. 1, Box 210, Osage City, Kans. 66523

Filed Apr. 2, 1975, Ser. No. 564,429

Int. Cl.² F26B *21/12*

U.S. Cl. 34—54 **10 Claims**

1. A controlled crop drying attachment for a combine which comprises:

a. a heat exchanger for mounting to the combine and operable connection to the combine engine for receiving waste heat therefrom;

b. a blower for mounting to the combine, operatively connected to the heat exchanger, and sucking ambient air through the heat exchanger to heat the air;

c. means for driving the blower; said driving means for

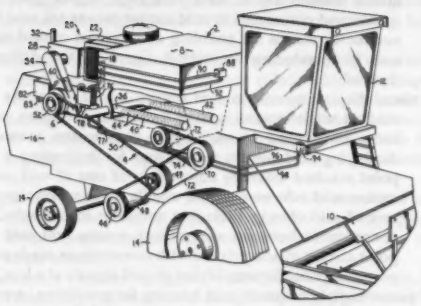
mounting to the combine and operatively connected to the blower;

d. a closed end duct for mounting to the combine and operatively connected to the blower to receive blower heated air therefrom, the duct having a portion thereof for mounting within a combine crop hopper, the portion mounted within the hopper having a plurality of perforations, whereby the blower blows the heated air through the perforations to dry the combined crops;

e. means controlling the temperature of the air blown into the combined crops for controlling the drying thereof;

f. said means controlling the temperature of the air blown into the combined crops in the hopper comprising:

1. a heat exchanger duct having an opening to ambient air and connecting the heat exchanger with the blower;



2. a damper pivotally mounted in the heat exchanger duct and movable between, and intermediate to, a position closing the opening and allowing a full flow of heated air through the duct, and a position fully opening the opening and blocking the heated air flow;

3. a transducer mounted in the closed end duct;

4. means for controlling the position of the damper in response to the temperature of the air flowing past the transducer; said controlling means being connected to the transducer and damper so that the ambient air and heated air mixture ratio is controlled, thereby controlling the temperature of the air blown into the combined crops in the hopper whereby the combined crop drying is controlled.

4,021,930

HAIR DRYER

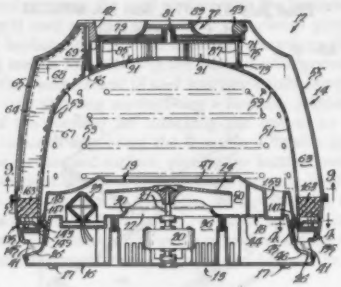
Algerd C. Churas, Westchester; Robert T. MacLagan, Park Forest, and William R. Hemrich, Glen Ellyn, all of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Jan. 13, 1976, Ser. No. 648,697

Int. Cl.² A45D *20/00*

U.S. Cl. 34—99 **14 Claims**

1. In a portable hard hat hair dryer of the type having a base, tubular air conduit means hingedly connected to the base, and a domed hood mounted on the upper end of the tubular air conduit means and having an air chamber formed therein, the improvement which comprises, air inlet means provided in the base, an electric motor, a fan driven by said motor for drawing air inwardly through said air inlet means and directing a flow of air upwardly through said air conduit means to said hood air chamber, heater means mounted in said base in the path of said air flow for heating same, means partitioning said hood air chamber into a plurality of sectors adapted for applying heated air to different parts of the head, said plurality of sectors including a circular top sector in communication with said tubular air conduit means and a series of circumferentially spaced, vertically extending sectors each of which is selectively adapted to have its upper end placed in communication with said top sector, a circular air flow control valve rotatable disposed within said top sector of said hood air chamber for directing heated air to various ones of said circumferentially spaced sectors, pin-and-slot hinge means for



attaching said hood to the upper end of said tubular air conduit, and slide latch means for automatically latching said hood to said base for storage or carrying purposes.

4,021,931

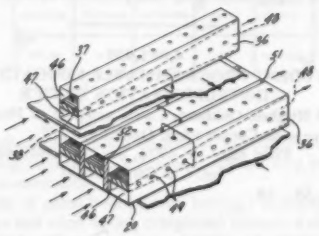
AIR CIRCULATING APPARATUS FOR FLOATING MATERIAL IN WEB FORM

Stephen J. Russ, Montreal, and Zoltan Beke, LaSalle, both of Canada, assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 21, 1975, Ser. No. 634,042

Int. Cl.² F26B *13/20*

U.S. Cl. 34—156 **8 Claims**



1. A fluid ejecting nozzle box for effecting fluid suspension of a web comprising:

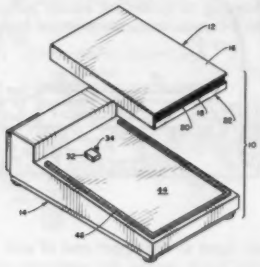
an elongate housing defining a correspondingly elongate fluid-dispensing chamber of gradually decreasing cross section in its downstream elongate direction and having a feed opening at the upstream end of the chamber through which fluid can be injected as a stream aligned in the lengthwise downstream direction of the chamber; said housing having a planate wall extending the length of, and partially defining, said chamber, said wall having an inner surface facing inside the chamber and a plurality of apertures spaced in said direction;

a like plurality of fluid-deflecting tabs, each tab supported by said wall along said inner side at the upstream edge of each aperture with its flat areas in transverse relation with said direction and extending inwardly of the chamber to lean upstream from said edge at an angle of approximately 45 degrees with respect to a portion of said wall extending upstream from said aperture to vary the direction of fluid passage from the respective adjacent aperture to an angle of approximately 90 degrees, respectively, with respect to said upstream wall portion.

4,021,932
AUDIOVISUAL DEVICE

Edwin A. Lipps, 205 Chautauqua Ave., Pacific Palisades, Calif. 90272

Filed July 31, 1975, Ser. No. 600,732
Int. Cl.² G09B 5/06
U.S. Cl. 35—8 A 2 Claims

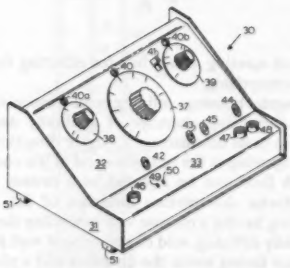


1. An audiovisual device, the combination of: a book having a front cover and printed material secured to said front cover; a tape container secured in operative relationship with said front cover and said printed material to serve as the rear cover of said book, said tape container having an opening therein for the reception of a tape head; a playback device having a tape head and capstan drive upon a surface thereof adapted to receive said book and said container, said opening being adapted to receive said tape head and capstan drive whereby said tape can be played simultaneously with the reading or viewing of the contents of the printed matter in said book; and interlock means on said tape head and said container to facilitate the engagement of said tape with said tape head and to prevent inadvertent dislodgement of said tape container from operative engagement with said playback device.

4,021,933
STUDENT-PROGRAMMABLE EDUCATIONAL INSTRUMENTATION DEVICE

Leonard Hughes, Oakland, Calif., assignor to Health Systems Management Corporation, Oakland, Calif.

Filed May 10, 1976, Ser. No. 684,540
Int. Cl.² G09B 23/00
U.S. Cl. 35—10 20 Claims



1. A programmable educational instrumentation device for aiding students in learning problem solving and measurement and instrumentation techniques as applied to a wide variety of physical and biological phenomena, said instrument including in combination:

at leat one sensor means for sensing a selected phenomena and generating therefrom an analogous electrical signal, said sensor means having connector means,

an instrument housing providing a program panel and a control panel and containing a plurality of electronic circuits,

said program panel having a series of spaced-apart connection means, each circuit being connected within said housing to at least one of said connection means, said connection means being adapted to receive an external conductive lead, whereby said device may be programmed into an instrument for measuring a phenomenon by interconnection of selected pairs of connection means,

said control panel having a plurality of control means each for controlling a said circuit,

input connector means on said housing for connecting a said sensor with a said circuit,

one of said circuits being a null-point circuit including reference signal generation means for generating at least one known adjustable reference signal, signal comparison means connected to said reference signal generation means and connected to said sensor means via said input connector means for enabling comparison of said signals and for producing an output signal as the difference thereof,

visual display means on said control panel, viewable by a student while operating said device, said display means being connected to said signal comparison means for displaying said output signal, and for indicating a null-point reached when by adjustment of one of said control means said reference signal equals said sensed signal,

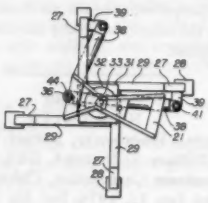
others of said circuits including amplifier means selectably connectable between said sensor means and said null-point circuit in accordance with connections made at said program panel for amplifying sensed signals at a low level,

power-supply means in said housing for providing operating voltages to said circuits and to external devices via connections at designated connection means of said program panel.

4,021,934
WINDSURFING TRAINING DEVICE

Glenn R. Taylor, 940 Cotton St., Menlo Park, Calif. 94025

Filed Jan. 28, 1976, Ser. No. 653,090
Int. Cl.² G09B 9/06
U.S. Cl. 35—11 9 Claims



1. A windsurfer training device comprising:

a. a horizontally disposed turntable upon which a windsurfer, with daggerboard removed, can be secured;

b. a shaft vertically affixed to the turntable and rotatably supporting the turntable on a stand;

c. a stand having at least three legs and bearings for receiving the shaft, such that the turntable and shaft are rotatably supported by the stand;

d. a radial crank connected horizontally to the shaft at its lower end, the crank having at least one hole adjacent its outer end;

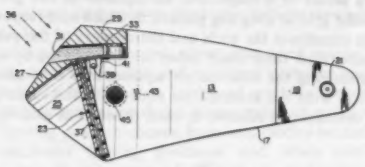
e. two shock absorbers, each having one end connected to the outer end of the crank, with the other end being connected to adjacent legs of the stand;

whereby when the windsurfer is secured to the turntable, the action of the wind on the sail is resisted by the shock absorbers so as to simulate water resistance during actual operation of the windsurfer.

4,021,935
FLIGHT TRAINING HOOD

Frank Witt, Rt. No. 4 Hidden Acres, Lexington, S.C. 29072

Filed Feb. 20, 1976, Ser. No. 659,906
Int. Cl.² G09B 9/08
U.S. Cl. 35—12 G 14 Claims



1. A flight training hood for limiting the vision of a pilot to the instrument control panel of his aircraft, comprising: hood means;

bistable, voltage controlled, lens means suitably secured to said hood means in a transverse relationship with respect to the line of sight of a wearer thereof, said lens means having a first state of transparency permitting the wearer to visually communicate therethrough, and operable to a second state of opacity for affecting visual communication;

light receiving transducer means operatively associated with the movement of said hood means for monitoring light from a predetermined area of space with respect to said hood means;

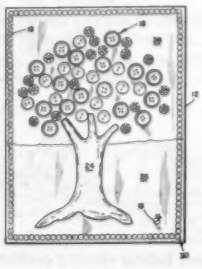
means for channeling light to said light receiving means, for restricting the reception of light by said light receiving means to directional light reception and for receiving directional light from an area of space lying substantially along a predetermined line of sight of the wearer;

electrical circuitry means cooperable with said light receiving means for voltage controlling said lens means, said circuitry means including means for providing a reference level corresponding to substantially the light intensity coming from the control panel of the aircraft and said circuitry means actuating said lens means to said second state responsive to a light intensity monitored by said light receiving means greater than said light intensity corresponded by said reference level, said lens means remaining in said first state with monitored light intensities below or equal to said light intensity corresponded by said reference level.

4,021,936
PICTURE KIT

Myron M. Stolzer, 130 Bud Lane, Levittown, N.Y. 11756

Filed Aug. 4, 1975, Ser. No. 601,503
Int. Cl.² A44B 1/18
U.S. Cl. 35—26 1 Claim

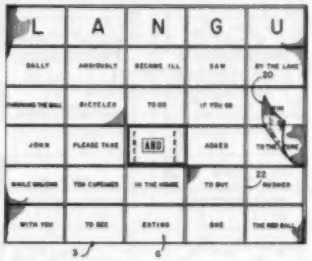


1. A picture kit for providing educational entertainment and for developing arts and crafts skills, the kit comprising at least one picture rendering card means for composing a picture, said card means having indicia on a surface for depicting an incomplete picture, said kit further including a plurality of buttons for cooperative attachment to the card means at designated areas on the card surface with the buttons forming an integral and artistic part of the completed picture, said buttons having at least one aperture therethrough, button securing means for attaching the buttons contiguously to the card surface with an end of said aperture confronting the card surface, said securing means being a flowable adhesive material, and the method for attaching the button to the card surface includes depositing the flowable adhesive at selected locations on the card surface, placing the buttons over respective deposits of adhesive and applying pressure to the button to cause the adhesive to flow into the confronting end of at least one of said apertures and to overlap the opposite end of said aperture for achieving a positive interlocking action upon setting and for permanently holding the buttons to the card surface.

4,021,937
EDUCATIONAL GAME APPARATUS

Margery Dena Kravitz, 42 Massapoag Ave., Sharon, Mass. 02067

Filed Sept. 2, 1975, Ser. No. 609,379
Int. Cl.² G09B 1/04
U.S. Cl. 35—35 H 2 Claims



1. An educational game apparatus to improve a player's sight reading, sentence composition, and parsing skills comprising in combination:

a plurality of game boards, each having a plasticized upper surface and each having designated thereon a plurality of adjoining columns and a plurality of perpendicularly intersecting adjoining rows defining a plurality of frames, and a plurality of language elements printed within said frames, each frame imprinted with a distinct language element, all words of said language elements being on the same line, one of said frames located in the center of each game board being designated as a "free" frame and containing a connective language element therein;

a plurality of planar members, each having imprinted thereon a distinct language element, said plurality of planar members forming a pool from which language elements are selected at random;

a master board for use by an instructor for arrangement thereon of said planar members after they have been randomly selected;

a container for holding said plurality of planar members from which they are randomly selected;

a plurality of markers, one of which is to be placed over a frame on said game boards corresponding to the language element on said planar member selected at random from said container, said game continuing until a player has formed with said markers on his game board a preselected pattern of markers, said language elements beneath said markers to be arranged into sentences utilizing

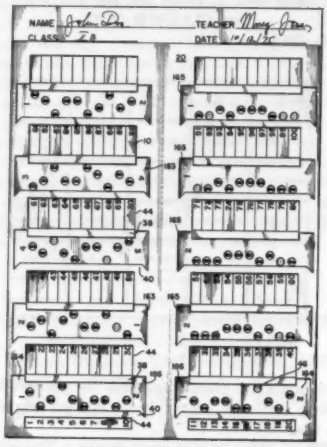
two or more of said language elements, the winning player being determined by the number and complexity of sentences so constructed;

a plurality of rectangular plastic films, each removably positioned upon each of said frames, each imprinted with the same language element imprinted on the frame beneath it, said plastic films adhering to said game boards' plasticized surface when placed theron;

a plurality of composition boards, one utilized in conjunction with each of said game boards, each of said composition boards having a plasticized surface upon which said plastic films can be removably positioned and arranged to form sentences; and

elevated borders around each frame on each of said game boards to assist in the repositioning of said plastic films and to prevent accidental movement of said plastic films when said plastic films are in position on their respective frames of said game boards.

4,021,938
ANSWER SCORING DEVICE
Frank R. Antioco, 88-34 50th Ave., Elmhurst, N.Y. 11373
Filed Jan. 16, 1976, Ser. No. 649,752
Int. Cl.² G09B *3/00*
U.S. Cl. 35—48 R **10 Claims**



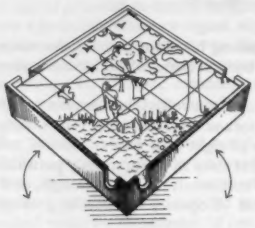
1. An answer scoring device for use with a readable answer sheet, that is made to fit the device, the answer sheet having a plurality of answer blocks wherein each block has answer columns, comprising:

a template having a plurality of openings therethrough each adapted for registry with one of said answer blocks on the answer sheet; and

means in each of said openings for receiving an answer card and hold the each of the answer cards in alignment with one of said answer blocks on the answer sheet, so as to permit visual indication of the answers on the answer sheet.

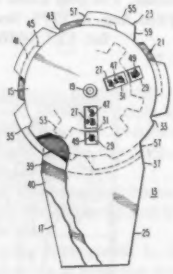
4,021,939
MOVIE-CUBES
Robert Joseph May, 92 Grove St., Apartment 38, New York, N.Y. 10014
Filed Oct. 3, 1975, Ser. No. 619,216
Int. Cl.² A63H *33/04*
U.S. Cl. 35—69 **8 Claims**

1. A graphics system comprising set of n^2 patterned surfaced, identically sized cubes, n being an integer at least 2, the patterned surfaces of the cubes being selectable by arranging a comprehensive non-repeating continuous pattern two pattern, the size of each square corresponding to the size of a face of the cubes, the grid being in the form of $3n$ nested inverted 90°V's, a respective leg on the same side of each of the V's, excluding the apex square, being formed of $(n\text{-}1)$ of said squares and the other leg of each of the V's, excluding the apex square, being formed of n of said squares, whereby the grid consists of $6n^2$ of said squares, for each of the cubes selecting a series of a respective six squares of the grid arranged on the grid in a zig-zag pattern in which said respective six squares constitute the ends and the corners of the pattern and are separated from each other in the pattern by $(n\text{-}1)$ squares, arranging the selected six squares into a continuous zig-zag array with the selected six squares in the same positions and orientations relative to each other as in said zig-zag



pattern and folding said zig-zag array into a cubic configuration to form the patterned surfaces of a respective one of said patterned cubes of said set, the arrangement of squares of said grid on the set of cubes therefore imparting to the set of cubes the characteristic that the set of cubes is capable of being arranged in a square array one cube deep with a $1n$ continuous portion of the comprehensive continuous pattern being exhibited by the upward directed faces of the cubes of the array and a complete cycle of the comprehensive continuous pattern can be serially exhibited by alternatingly moving a single row of cubes from respective two adjoining edges of the array to opposite edges thereof while rotating the cubes of the row 90° in the direction in which the row is moved for a total of $6n$ such moves.

4,021,940
EDUCATIONAL DEVICE
David Saint, R.D. 2, Box 101, Elverson, Pa. 19520
Filed June 22, 1976, Ser. No. 698,350
Int. Cl.² G09B *3/00*
U.S. Cl. 35—74 **12 Claims**



1. An educational device having a clockwise and a counterclockwise problem indicia viewing position, said device comprising:

a windowed front plate fashioned to be held by hand;

a solid rear plate fashioned in form substantially identical to said windowed front plate;

pivotal means secured to said back plate and extending through said front plate;

a display disk rotatably mounted between said back plate and said front plate on said pivot means, said display disk having a plurality of pairs of problem indicia and solution indicia, at least one problem indicium thereof being visible through said windowed front plate in both said clockwise and said counterclockwise indicia viewing position; and

masking means rotatable about said pivot means, interposing said display disk and said front plate for masking said solution indicia when both said masking means and said display disk are rotated into a selected problem indicia viewing position chosen from said clockwise and counterclockwise viewing positions, and, when said masking means alone is rotated from said selected problem indicia viewing position to a solution indicia viewing position, for permitting visible display through said windowed front plate of the solution indicia paired with all the problem indicia in said at least one problem indicium visible through said front plate.

4,021,941

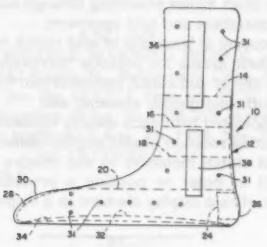
DISPOSABLE FOOTWEAR

John J. Caggiano, 3965 Monticello Ave., Bronx, N.Y. 10466

Filed June 22, 1976, Ser. No. 698,327

Int. Cl.² A43B *3/10*

U.S. Cl. 36—10 **1 Claim**



1. Footwear comprising a sock body of disposable material having a plural generally vertically spaced apart generally horizontal lines of perforation in its wall for facilitating removal of selected upper portions of said sock body for changing the height of said body; a foot pad of absorbent material adhered along a bottom interior wall of said sock body for receiving medicament for application to the sole of the foot of the user; and a strip of absorbent fragrant material adhered along a portion of the exterior of said sock body for receiving a liquid insect repellant.

4,021,942

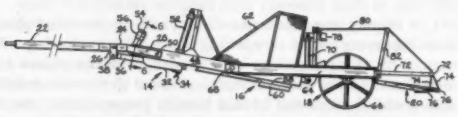
SNOW HANDLING AND CONDITIONING APPARATUS

Floyd E. Purdy, 1747 Clark Lake, Brighton, Mich. 48116

Filed July 26, 1976, Ser. No. 708,887

Int. Cl.² E01H *4/00;* **A01B** *5/00*

U.S. Cl. 37—10 **11 Claims**



1. Snow handling and conditioning apparatus comprising a tongue assembly including a tongue for attachment to a tow vehicle and a transverse crossbar connected at its midpoint to said tongue, a ripper assembly including a transverse ripper frame having shoes on its outer sides for travel on snow and ripper teeth supported between said shoes so that their ends can project below the lower surfaces of said shoes for penetrating into said snow, a pair of ripper pivot couplings connected at forward ends to said crossbar for pivotal movement in fore-and-aft vertical planes and connected at rearward ends to said ripper frame by limited yieldable joints, one ripper pivot coupling being connected to said crossbar between said midpoint and one of its ends and the other ripper pivot coupling being connected to said crossbar between said midpoint and the other of its ends, support means for travel on snow positioned to the rear of said crossbar and connected to the ends thereof for maintaining the crossbar in an elevated position when said apparatus is being towed, and ripper actuating means connected between said support means and said transverse ripper frame for selectively raising and lowering said transverse ripper frame desired amounts relative to said support means and thereby relative to the surface of the snow.

4,021,943

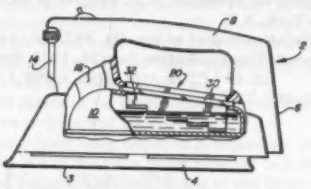
PRESSING IRON WATER LEVEL GAUGE

Alan R. McMullen, North Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio

Filed Feb. 23, 1976, Ser. No. 660,235

Int. Cl.² G01F *23/02;* **D06F** *75/00*

U.S. Cl. 38—77.2 **3 Claims**



1. In a pressing iron having a horizontal position wherein said iron is supported by its pressing surface and a vertical position wherein the pressing surface of said iron is in a generally vertical plane, and a water reservoir in said iron, the improvement comprising:

a water level gauge carried by said iron and cooperating with the upper surface of a variable quantity of water in said reservoir to indicate the quantity of water therein;

said gauge having a portion so located relative to the upper surface of the water in said reservoir that such variable upper water surface cooperates in the same manner with said gauge portion when said iron is in either of the aforesaid positions whereby the same level is indicated in either of said positions.

4,021,944

DISPLAY DEVICE WITH ORBITALLY MOVABLE PLATES

Charles E. Trame, Fox Point, Wis., assignor to Everbrite Electric Signs, Inc., South Milwaukee, Wis.

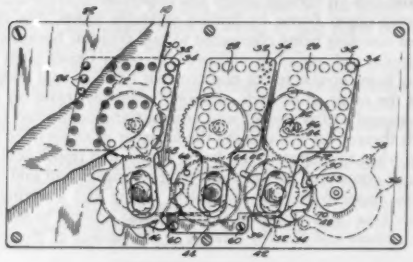
Filed May 3, 1976, Ser. No. 682,939

Int. Cl.² G09F *11/00*

U.S. Cl. 40—28 C **7 Claims**

1. In a display device having an opaque face plate, at least one array of openings formed in said face plate, said openings being arranged to form indicia when light is transmitted through a predetermined group of said openings, an opaque back plate movably mounted adjacent to said face plate, an array of openings formed in said back plate and positioned to coact with the openings in said face plate to form said indicia, and means for orbitally moving said back plate with respect to said face plate, the improvement wherein said means includes a first gear wheel rotatably mounted adjacent to said back plate, a second gear wheel rotatably mounted adjacent to said back plate in mesh with said first gear wheel, first eccentric

drive means between said first gear wheel and one portion of said back plate, second eccentric drive means between said second gear wheel and another portion of said back plate



which is spaced from said first eccentric drive means, and means for rotating one of said gear wheels to move said back plate in an orbital path.

4,021,945

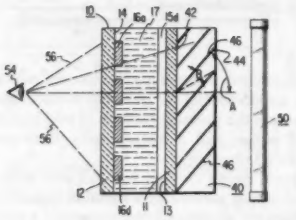
LIQUID CRYSTAL DEVICE WITH LOUVER MEANS LOCATED BEHIND THE LIQUID CRYSTAL DEVICE

Alan Sussman, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 852,664, Aug. 25, 1969, abandoned. This application July 26, 1971, Ser. No. 166,192

Int. Cl.² G02F *1/34, 1/30;* **G09F** *13/06*

U.S. Cl. 40—28 C **8 Claims**



1. A display device comprising a liquid crystal cell reversibly switchable between light transparent and light scattering states, said cell being designed to be viewed along directions intersecting a front surface thereof;

a louver means disposed adjacent to a rear surface of said cell and being effective to allow illumination of said cell by light incident onto said rear surface only along directions different from said viewing directions, whereby, when said cell is in its transparent state, the passage of light along said viewing directions is prevented;

said cell being effective, when in its light scattering state, to direct light incident onto said rear surface along said viewing directions.

4,021,946

MULTIELEMENT CHANGEABLE SIGN DISPLAY

James T. Bradshaw, Lake Dallas, Tex., assignor to F & M Systems, Co., a division of Fischbach and Moore, Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 511,511, Oct. 3, 1974, abandoned. This application May 29, 1975, Ser. No. 581,943

Int. Cl.² G09F *11/10*

U.S. Cl. 40—33 **41 Claims**

1. A sign display comprising:

a plurality of display elements positioned in rows and columns to define a display matrix;

each of said display elements having a plurality of substantially planar display surfaces;

drive shaft means extending through the display elements of each column substantially parallel to the display surfaces thereof;

a pair of frusto conical clutch members disposed on opposite ends of each display element and each connected for rotation with said drive shaft means, one of said clutch members normally biased against an end of a display element for causing rotation of said display element with rotation of said drive shaft means,

said clutch members comprising a pair of apertures having a predetermined configuration formed in the opposite ends of said display element;

said pair of clutch members being received in the apertures of said display element;

said drive shaft means extending through said frustoconical clutch members and said apertures;

means securing at least one of said clutch members to said drive shaft means for rotation therewith; spring means biasing one of said clutch members into frictional engagement with said display element; and

means associated with each display element for selectively terminating rotation of said display element and for causing said clutch members to slip relative to said display element in order to position a predetermined display surface of said display element in a display plane.

4,021,947

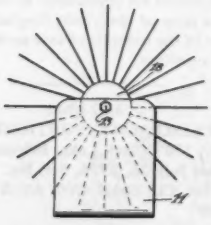
ROTARY DISPLAY STANDS

Aaron H. Shneider, 2835 N. Western Ave., Chicago, Ill. 60618

Filed Oct. 30, 1975, Ser. No. 627,100

Int. Cl.² G09F *11/02*

U.S. Cl. 40—68.6 **2 Claims**



1. A display stand for a plurality of radially mounted planar data displaying means comprising a base element having a flat bottom of a length greater than the length of the planar data means and a base width at least sufficient to provide stability with a wall at each end of said bottom perpendicular thereto and an opening in the distal end of each of said walls; a spindle inserted in said openings, said spindle comprising a mid-portion and two end portions, the mid-portion of said spindle being of a greater diameter than the end portions to provide a shoulder at each end of said mid-portion, means on at least one end portion to cooperate with spindle knobs to secure said

spindle within said base; means to support said data display elements on said spindle comprising a pair of cup-shaped elements each having an opening in the bottom surface to frictionally receive the end portion of said spindle and an external and internal bead on the rim of each element, each element being inserted on the end portion of said spindle in frictional engagement therewith and with said shoulder, the elements further being in facing relationship with reference to said beads; each of said data display elements comprising an envelope-like element of flexible material having an opening for the insertion and retension of the data, and a portion for slidable assembly on said cup elements, the portion of the envelope-like element to be assembled on said cup elements having a pair of spaced circular openings and a diverging slot parallel to said spindle and leading from each opening to the adjacent outer edge of said envelope-like element, said openings being of a size to receive said beads on each of said cup elements in slidable relationship therewith, said slot at its intersection with its opening being of a width to receive the wall of said cup-like element and to form at least one stop so as to retain said beads within said openings.

4,021,948

FOLDABLE WARNING DEVICE

Alfred Mosch, 442 Poplar St., Bridgeport, Conn. 06605

Continuation of Ser. No. 613,916, Sept. 16, 1975, abandoned, which is a continuation of Ser. No. 354,219, April 25, 1973, abandoned. This application Aug. 26, 1976, Ser. No. 717,880

Int. Cl.² G09F *21/04*

U.S. Cl. 40—129 C **1 Claim**

1. A foldable warning device, for use suspended between an open receptacle cover of a vehicle and a lower portion of the vehicle,

comprising, in combination:

a trapezoidal shaped flexible sheet having first and second parallel edges, said first parallel edge being longer than said second parallel edge, and two angularly off-set side edges between said parallel edges completing the trapezoidal shape,

a resilient elongated connector having two end portions, each removably secured near opposite ends to said first parallel edge and operative to engage a portion of the open cover, whereby said first parallel edge may be resiliently and removably secured to the open cover;

two substantially equally long fastening straps, each connected to an end of said second parallel edge and each projecting along an extension of the respective side edge, said straps intersecting thereby completing an overall triangular shape with a downward pointing apex when the warning device is suspended on the vehicle, and

a buckle hook secured to said straps at the intersection thereof and operative to be secured to the lower portion of the vehicle.

4,021,949

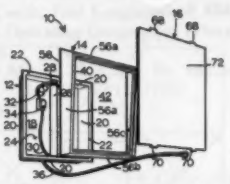
ILLUMINATED SIGN SYSTEM

Donald H. Niehaus, Crestview Hills, Ky.; Nick J. Schwab, Cincinnati, Ohio, and Patrick J. Seggerson, Fort Mitchell, Ky., assignors to American Sign and Advertising Services, Inc., Florence, Ky.

Filed Apr. 7, 1976, Ser. No. 674,611

Int. Cl.² G09F *13/04*

U.S. Cl. 40—132 R **18 Claims**



1. A sign, comprising:

a. a pan-shaped back, having a rear wall and sidewall means peripherally joined to the rear wall, the sidewall means extending generally forwardly, thereby providing the back with a concavity which opens forwardly;

b. a pan-shaped front, having a front wall and sidewall means peripherally joined to the front wall, the sidewall means extending generally rearwardly, thereby providing the front with a concavity which opens rearwardly;

c. the sidewall means of the back terminating distally of the back wall in a perimetrical rim;

d. the sidewall means of the front terminating distally of the front wall in perimetrical edge means;

e. said back and front being disposed in adjacency with the perimetrical rim of the back being adjacent and in registry with the perimetrical edge means of the front;

f. securement means on the back and front maintaining said adjacency and registry;

g. means defining a relatively large aperture through said front wall of said front, said aperture being spaced from said sidewall means of said front, perimetrically of said aperture by said front wall, so that said front wall and the sidewall means of said front do border and frame said aperture;

h. said front wall, immediately adjacent where said front wall borders said aperture, including generally L-shaped ledge means including a first portion which extends rearwardly, and a second portion which extends inwardly, so that the L-shaped ledge means provides a recess, through which said aperture opens;

i. a sign face panel having an outer peripheral edge portion, said sign face panel being received in said recess, spanning said aperture and having said outer peripheral edge portion supported upon said L-shaped ledge means:

the pan-shaped back, the pan-shaped front, the aperture and the sign face panel all being generally rectangular, so that said aperture has two sets of opposed sides;

said L-shaped ledge means being provided on both of the opposed sides of at least one of said two sets of opposed sides of said aperture;

j. a plurality of outwardly projecting tabs on said sign face panel extending from spaced sites along the peripheral edge portion thereof;

k. means defining correspondingly spaced slots in the rearwardly extending first portion of the L-shaped ledge means;

said tabs being removably received in the slots to removably secure the sign face panel across the aperture;

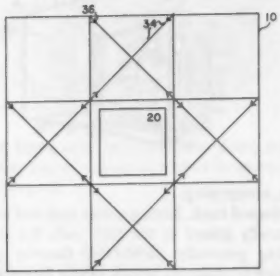
l. an electric lamp;

m. means mounting the electric lamp on the pan-shaped back in said concavity thereof; and

said sign face panel including at least a portion capable of

transmitting light, whereby said electric lamp, when lit, back-lights the sign face panel, and whereby said lamp may be serviced through said aperture upon removal of said sign face panel.

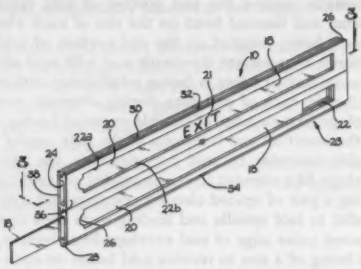
4,021,950
MAGIC WINDOW
Satya Pal Asija, 1674 Marion St., Saint Paul, Minn. 55117
Filed Mar. 8, 1976, Ser. No. 665,104
Int. Cl.² G09F *1/00*
U.S. Cl. 40—158 R **3 Claims**



1. An origami magic device comprising:
a. a first square piece of paper having two parallel vertical and two parallel horizontal equidistant creases;
b. an aperture in said first square piece of paper of a size somewhat smaller than the area enclosed by said two vertical and said two horizontal creases;
c. a plurality of exhibit areas of approximatelysame size as said aperture around the circumference of said aperture;
d. a second square piece of paper identical to said first square piece of paper in all respects, including said aperture, said creases and said exhibit areas, wherein said second square piece of paper is joinedback to back to said first square piece of paper around the periphery of said aperture within the boundary formed by said two vertical and said two horizontal equidistant creases;
e. eight different exhibits, placed one each, in the eight squares made by said vertical and horizontal creases on said first square piece of paper, and exact duplicates of said eight different exhibits on said second square piece of paper in the like manner; and
f. two pairs of equidistant diagonally parallel creases made at approximately 45° angle to said vertical and horizontal creases on said first and second pieces of paper.

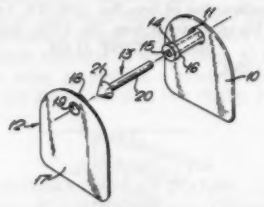
4,021,951
FILM STRIP CARRIERS
Paul Vanostrand, 4635 Ledge Ave., North Hollywood, Calif. 91602
Filed Dec. 8, 1975, Ser. No. 638,980
Int. Cl.² G09F *1/12*
U.S. Cl. 40—159 **9 Claims**

1. A film carrier assembly for use with a back-lit directory for selectively retaining a film strip therein comprising:
at least a first elongated panel for slidably retaining said film strip having an opening disposed therethrough to permit light to propagate freely through a substantial portion of said film strip;
a groove extending along the length of the top of said panel, said groove having alignment means disposed thereon; and
a tongue member extending along the length of the bottom of said panel, said tongue member having engagement means disposed thereon, said alignment means for interlocking with associated engagement means on a second panel, and said engagement means for interlocking with associated alignment means on a third panel, said engagement and alignment means for preventing translation of said elongated panel in a direction parallel to the elongation of said elongated panel,



said groove and said tongue members arranged and configured on said first panel whereby additional panels are selectively coupled to said first panel in an interlocking and substantially light-tight tongue and groove configuration.

4,021,952
EARTAGS
Cuthbert Brierley, Lower Hitch, Whitchurch Hill, near Pangbourne, Reading, Berkshire, England
Filed Nov. 11, 1975, Ser. No. 631,177
Claims priority, application United Kingdom, Nov. 19, 1974, 50136/74; Jan. 15, 1975, 1711/75
Int. Cl.² G09F *3/00*
U.S. Cl. 40—301 **5 Claims**



1. An animal identification eartag comprising a male tab, a female tab and a removable rigid pin, the male tab having an integral stem normal to the plane of the tab, the male tab and stem and the female tab being formed of a flexible plastics material, the female tab having a circular aperture and the stem on the male tab having an axial bore extending along the whole of its length with the stem being of smaller diameter than the aperture, in the female tab, the stem having an outer free end remote from the male tab and formed with a head which head is of larger cross-section than the stem to form a shoulder between the head and the stem, the aperture in the female tab being slightly smaller than the size of the head, and said pin comprising a shank portion having a conical head with a pointed tip, said shank portion of the pin being insertable in the bore of the stem to stiffen the stem, the outer diameter of the head of said pin being at least as great as the diameter of the head of said stem.

4,021,953
SHOPPING CART DISPLAY GUIDE SELECTOR
Vernon Evan Couch, Box 877, Iola, Tex. 77861
Filed Nov. 17, 1975, Ser. No. 632,197
Int. Cl.² G09F *11/02*
U.S. Cl. 40—308 **5 Claims**

1. An information device for use with a shopping cart hav-

ing a horizontal handle, said device being attached to said handle with said device being parallel to, forwardly of and upwardly of said handle, said device including:

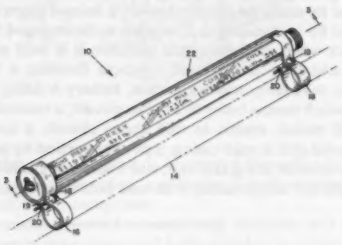
an outer cylinder having a viewing window substantially longitudinal therewith;

an inner cylinder rotatably located in said outer cylinder, said inner cylinder having a knob means on one end thereof for rotating said inner cylinder;

means for retaining said inner cylinder in said outer cylinder;

friction means between said inner cylinder and said outer cylinder to frictionally maintain said inner cylinder in any desired position;

means for attaching said outer cylinder to said handle;



said inner cylinder having a surface for attaching an information sheet thereto, sufficient space being allowed between said inner and outer cylinder for said information sheet, information on said sheet being readable through said viewing window, said viewing window having a magnification factor to better read said information;

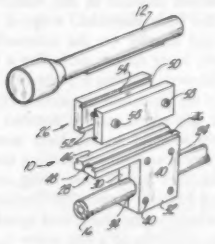
said means for attaching including a C-shaped portion and opposing arcuate portions extending from said C-shaped portion, bolt means extending between said C-shaped portion and said opposing arcuate portions, said opposing arcuate portions clamping to said outer cylinder and said C-shaped portion adapted for clamping to said horizontal handle upon tightening said bolt means.

4,021,954

TELESCOPIC SIGHT MOUNT

Howard E. Crawford, 23107 Cherry Hill, Dearborn, Mich. 48124

Filed Jan. 26, 1976, Ser. No. 652,564
Int. Cl.² F41G 1/38
U.S. Cl. 42—1 ST **11 Claims**



1. A sight mount for securing a telescopic sight to a barrel of a rifle, said sight mount comprising:

a bracket secured around the barrel of said rifle, said bracket having an upper portion in a spaced apart and parallel relationship to said barrel of said rifle;

a sight adapter comprising a pair of plate members, said sight adapter being axially slidably mounted to said upper portion of said bracket;

first tongue means formed along the upper end of said plate members to lockingly engage said sight; and

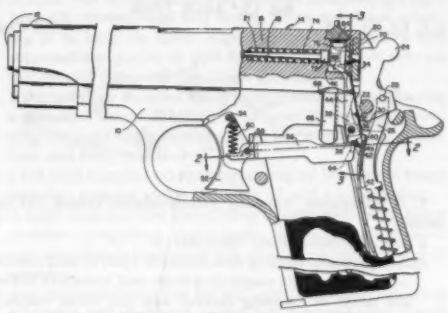
second tongue means formed along the lower end of said plate members to lockingly engage said bracket.

4,021,955

FIRING PIN LOCKING DEVICE AND METHOD

George Francis Curtis, East Longmeadow, Mass., assignor to Colt Industries Operating Corporation (Firearms Division), Hartford, Conn.

Filed May 3, 1976, Ser. No. 682,362
Int. Cl.² F41C 17/04
U.S. Cl. 42—70 F **4 Claims**



1. In an improved firearm of the type comprising:

a frame;

a barrel mounted on the frame;

a breech-slide mounted on the frame for sliding movement between forward and rearward positions;

a firing pin mounted in the breech-slide for travel between firing and retracted positions;

a hammer, having a searing surface thereupon, mounted on the frame for movement between cocked and fired positions, the hammer being adapted to strike the firing pin as it moves into the fired position for causing the pin to engage a cartridge chambered in the barrel and being adapted to be cocked by the breech-slide as it moves rearwardly;

a trigger mounted on the frame for movement between normal and pulled positions;

a sear movably mounted on the frame for engaging the searing surface of the hammer such that it may be retained in the cocked position;

a bar connected to the trigger for pivotal movement with respect thereto between lower and upper positions and for rearward and forward movement with respect to the frame when the trigger is respectively pulled and released, the rearward movement of the bar serving to displace the sear to occasion disengagement with the searing surface of the hammer, whereby the hammer may fall to the fired position;

a disconnect movably mounted on the frame such that when the breech-slide moves rearwardly it displaces the disconnect from a first position to a second position, the disconnect being in engagement with the trigger bar so as to pivot the trigger bar to the lower position such that the trigger bar disengages from the sear during displacement of the disconnect; and wherein the improvement comprises:

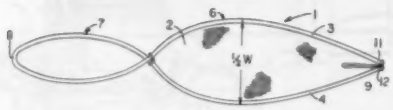
a firing pin lock, having an abutment surface thereupon, slideably mounted on the breech-slide for sliding between a movement permitting position in which travel of the firing pin from the retracted position to the firing position is unimpeded and a movement preventing position in

which the abutment surface is adapted to engage and obstruct the firing pin during travel toward the firing position;

means to bias the lock toward the movement permitting position; and

means to responsive to movements of the trigger bar to maintain the lock in the movement preventing position when the bar is in the upper position and the trigger is in its normal position and also when the bar is in the lower position and the trigger is in either its normal or pulled position and to release the lock for movement to the movement permitting position as the trigger is pulled and the bar is in the upper position.

4,021,956
FISHING NET
John A. Hogg, 2225 S. 36th St., Galesburg, Mich. 49053
Filed Aug. 18, 1976, Ser. No. 715,228
Int. Cl.² A01K *77/00*
U.S. Cl. 43—12 **9 Claims**



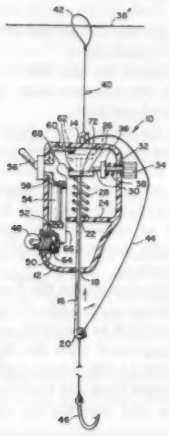
1. A collapsible manually manipulatable fishing net comprising:

a pair of crossed frame members;

means pivotally relating first adjacent ends of said members and a flexible net suspended from said members between the point of crossing thereof and the other respective ends thereof; and

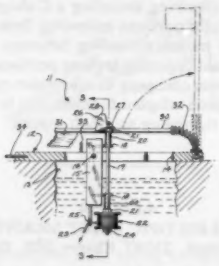
resilient means continuously urging said last-named ends toward each other.

4,021,957
FISHLINE JERKING DEVICE, BITE SIGNAL AND SCALE
Martin G. Gleason, 1618 N. Gardiner Drive, N. Bayshore, N.Y. 11706
Filed Apr. 26, 1976, Ser. No. 680,500
Int. Cl.² A01K *97/12*
U.S. Cl. 43—16 **1 Claim**



1. A combined fishline jerking device, bite signal and scale comprising: an elongated casing having front and rear ends; a first loop carried fixedly at the rear end of said casing; an elongated member mounted longitudinally in said casing for longitudinal movement relative to said casing between first and second positions; said member having one end projecting from the front end of said casing carrying a second loop; said first and second loops being adapted to receive a line wrapped serially about said first and second loops at spaced apart positions along said line; said first position being characterized by said elongated member projecting further from said casing than in said second position; spring means for urging said elongated member to said second position for jerking said line; releasable catch means acting against said member for retaining said member in said first position; said catch means being releasable in response to the application of a force component on said second loop by said line generally perpendicular to the axis of said member; a lamp holding means and a battery holding means carried by said casing; a first electrical contact carried by said elongated member; a second electrical contact carried by said casing in a location to be engaged by said first contact when said elongated member is in said second position; said first and second contacts forming a first switch means; said lamp holding means, battery holding means and first switch means being in a series circuit; a manually actuable second switch means in said series circuit; a longitudinally elongated slot in said casing; a pointer carried by said member for movement along said slot; and a series of graduations along said slot for cooperation with said pointer as a scale.

4,021,958
ICE FISHING TIP-UP
William R. Snodie, 357 Bradley Ave., Delavan, Wis. 53115
Filed Oct. 6, 1975, Ser. No. 619,943
Int. Cl.² A01K *97/12*
U.S. Cl. 43—17 **2 Claims**

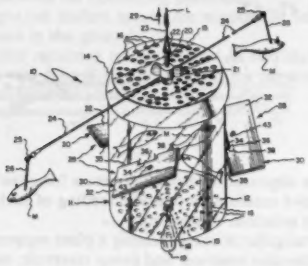


1. In an ice fishing tip-up, a base member adapted to span an ice fishing hole, a shaft, means for rotatably supporting the shaft generally normal to the base member, said shaft projecting downwardly beneath the base member for submergence of the lower end portion thereof in the water and extending upwardly above the base member, a spool for fishing line mounted axially and fixedly on the submersible lower end portion of the shaft, lever means including a latch portion of flexible light weight metal having a plate-like shape and fixed to the upper end of the shaft and projecting radially therefrom whereby to rotate the spool and be rotated by the spool, a signal mast flexibly secured to the base member in spaced relation from the shaft, and means biasing the signal mast to an upright position, said signal mast being swingable against the pressure of the biasing means for frictional engagement under the latch portion on the shaft, said spool being rotatable with the shaft as in response to a fish strike to rotate the latch portion and release the signal means to indicate the strike, and said latch portion being subject to bending to a desired position partially encircling the signal mast by finger manipulation and capable of retaining such position whereby the frictional hold on the signal mast is varied in accordance with the size and type of live bait used on the hook at the submerged end of the fishing line.

4,021,959
FISHING LURE

Chester A. Antkowiak, 201 Willett St., Buffalo, N.Y. 14206

Filed Aug. 18, 1976, Ser. No. 715,292
Int. Cl.² A01K 97/04
U.S. Cl. 43—41 3 Claims



1. In a fishing lure adapted to be moved through a body of water in at least one direction, and having a body member, the improvement which comprises:

rotation means mounted on said body member and selectively operable to cause said body member to rotate when said lure is moved in said one direction, said rotation means including

at least one blade pivotally mounted on said body member about an axis inclined at an acute included angle to said one direction, said blade being adapted to normally pivot to an inoperative position against said body member when said lure is moved in said one direction; and

a hook member pivotally mounted on said body member proximate each blade, said hook member being adapted to be selectively moved to a concealed position against said body member to enable said blade to pivot to said inoperative position, and adapted to be selectively moved to an extended position to engage said blade and to prevent said blade from moving to said inoperative position against said body member,

whereby, when said hook member is moved to said extended position, said blade may be held in an operative extended position to cause said body member to rotate as said lure is moved in said direction.

4,021,960
DOLL HOUSE HAVING LEFT AND RIGHT ROOF MEMBERS

Harry E. Walmer, 721 N. Overlook Drive, Alexandria, Va. 22305

Filed Sept. 23, 1975, Ser. No. 615,894
Int. Cl.² A63H 33/10
U.S. Cl. 46—19 7 Claims

1. An easily assembled knock-down doll house having an A-frame design, the parts of which are fitted together and held together only with pegs comprising:

a. a generally rectangular first floor member comprising right, rear, and front grooves in the top surface thereof, at least one intermediate groove in said surface parallel to said rear and front grooves;

b. a right side wall member having a size and shape adapting it to have its bottom edge engage said right groove of said first floor member, comprising vertical L-shaped beams at its opposite ends and a top horizontal beam member disposed on the inner front wall containing at least one vertical slot;

c. rear and front wall members having respective sizes and shapes adapting them to have their right edges engage respective said L-shaped beams of said right side wall member and their bottom edges engage

c. respective said rear and front grooves of said first floor, each of said walls containing an inner horizontal beam member having an inward said groove, each of said walls containing inwardly slanted upper right and left edges, and a slot disposed at the terminus of said angled top edges;

d. at least one intermediate wall member comprising a right inwardly slanted edge and having a size and shape adapting it to have its lower edge engage a respective said intermediate groove in said first floor and a said vertical slot of said right wall top beam member;

e. a second floor member comprising a stairwell, and having a size and shape adapting it to have its rear and front edges engage said grooves of said beam members of said rear and front walls;

f. a left roof member comprising an angled horizontal beam member secured to the top edge of said roof member;

g. a right roof member comprising a horizontal ridge beam member comprising downwardly depending rib means, said ridge beam secured to the inner top edge of said roof member;

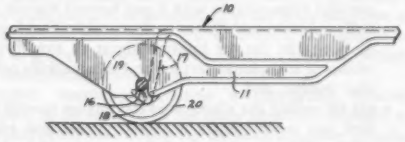
h. said right roof member having a size and shape adapting it to have said rib means engage said terminus slots of said rear and front wall members, and to have said inner surface of said right roof member engage said inwardly slanted edge of said intermediate member and said right edges of said rear and front wall members, said left roof member being constructed and arranged to have said angled horizontal beam member engage and overlap said horizontal ridge beam member, and to have said inner surface of said right roof member engage said inwardly slanted left edges of said rear and front wall members;

i. a plurality of pegs having respective sizes and shapes adapting them to be inserted in holes contained in said walls and floor members at their junctures with each for retaining said assembled structure together.

4,021,961
WHEEL MOUNTING FOR TOY VEHICLES

Thomas W. Good, Minnetonka, Minn., assignor to Tonka Corporation, Hopkins, Minn.

Filed Jan. 14, 1976, Ser. No. 649,429
Int. Cl.² A63H 17/05
U.S. Cl. 46—201 3 Claims



1. In a miniature toy vehicle,

a. an elongated chassis having a pair of transversely spaced portions with transversely spaced downwardly opening notches,

b. a rigid axle member seated in said notches and carrying wheels at its ends,

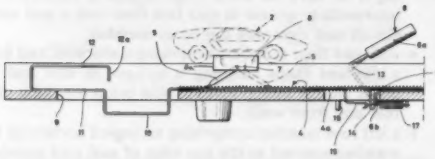
c. a hook member of resilient material formed integral with the chassis and depending therefrom between said transversely spaced portions on the chassis,
d. said hook member having a latch portion positioned to releasably secure the wheel axle in said notches and
e. at least one gusset carried by the chassis and depending adjacent the rigid axle member to limit its movement away from the axle-retaining action of said hook member.

4,021,962

DEVICE IN CONNECTION WITH GAMES OR TOYS

Helge A. W. Axryd, Cederbourgsgatan 8, 412 55 Goteborg, Sweden

Filed Dec. 11, 1975, Ser. No. 639,906
Claims priority, application Sweden, Dec. 12, 1974, 7415518
Int. Cl.² A63H *18/14*
U.S. Cl. 46—202 **5 Claims**



2. The toy of claim 1 in which part of said bent wire is vertically disposed in the axial path of the object and cooperating with a part of said object to form a stop dog.

4,021,963

ACTION TOY

Henry Kingswell, Weston, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 1, 1976, Ser. No. 701,646
Int. Cl.² A63H *33/02*
U.S. Cl. 46—220 **2 Claims**

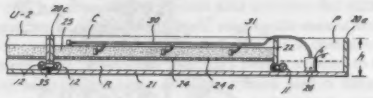
1. An action toy, comprising
a wheel having a substantially planar surface of disc-like configuration having a rim therearound of substantially circular cross-section with a gap formed therein substantially opposite said planar surface, said wheel being rollable along its rim for rotation about an axis through the center of said planar surface and substantially perpendicular thereto; and
a rod for rolling the wheel, said rod having spaced opposite first and second ends, a handle at the first end and a substantially circular part at the second end, said substantially circular part having a gap formed therein and being adapted to fit around the outside of the rim of the wheel, and a braking member extending angularly from the second end of the rod to a point within and spaced from the circular part and passing through the gap of the rim and being adapted to abut the inside of the rim to halt the rolling of the wheel.

4,021,964

HYDROPONIC SYSTEM CONVERTIBLE TO AN OPEN OR CLOSED SYSTEM

William B. Darwin, and Joseph Michael Livengood, both of Conroe, Tex., assignors to William B. Darwin

Filed Feb. 11, 1976, Ser. No. 657,153
Int. Cl.² A01G *31/00*
U.S. Cl. 47—62 **6 Claims**



1. An improved hydroponic system for growing plants in a supportive medium by periodic feeding of such plants with a nutrient solution, comprising:
a rectangular housing forming a plant supporting chamber, collection reservoir and pump reservoir, said rectangular housing being formed by first, second, third and fourth upstanding walls having a common bottom, said second and fourth walls being side walls and said first and third wall being end walls;
an upstanding partition extending between said second and fourth, oppositely positioned side walls;
a horizontal panel having openings therein extending from said upstanding partition to said second, third and fourth walls and being vertically spaced from said bottom to form a collection reservoir below said panel and a plant supporting chamber above said panel, said panel allowing drainage of fluid from said plant supporting medium to said collection reservoir, said plant supporting chamber having a supportive medium for supporting plants;
said first, second and fourth walls and said bottom cooperating to form said pump reservoir for containing a nutrient solution and pump means for pumping said nutrient solution contained in said pump reservoir into said plant supporting chamber through a fluid distribution line;
conversion means mounted with said collection reservoir and pump reservoir for converting said system into either a closed or open hydroponic system, said conversion means including:
first valve means positioned in said upstanding partition below said horizontal panel between said pump reservoir and collection reservoir for providing fluid communication therebetween to operate said hydroponic system as a closed system in which a nutrient solution is circulated from said pump reservoir to said plant supporting chamber and drained into said collection reservoir in fluid communication with said pump reservoir;
said first valve means preventing fluid communication between said collection reservoir and said pump reservoir to cooperate with a second valve means to operate said hydroponic system as an open system; and
said second valve means for providing drainage to atmosphere of said nutrient solution after passage through said support medium of said collection reservoir to operate said hydroponic system as an open system.

4,021,965

FERTILIZER AND PESTICIDE DISPENSING STAKE

Frank W. Norris, Horse Cove Road, Highlands, N.C. 28741

Filed Aug. 6, 1975, Ser. No. 602,417
Int. Cl.² A01G *29/00, 17/04;* A01M *1/20*
U.S. Cl. 47—48.5 **9 Claims**

1. Growth support stake means for nourishing, supporting and protecting a plant growing adjacent thereto comprising:
elongated stake body means defined by first and second conformally shaped, coterminous, hollow mating sections defining an internal cavity means therebetween for retaining material within said stake means;

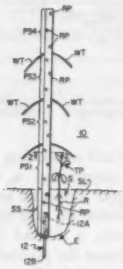
release ports defined in said stake means connecting said internal cavity means with the exterior of said stake means;

means internally dividing said stake body means and said internal cavity means into a subsoil portion and a plurality of above-ground portions;

said subsoil portion for containing fertilizer and said above-ground portions for containing pesticide;

elongated ground anchor means for supporting said stake body means in the ground;

ground anchor receiving means defined in said stake body means in said subsoil portion thereof for removably receiving said ground anchor means; and



plant tie means integral with said stake body means and selectively spaced thereon for engaging an adjacent plant at various growth heights thereof to support said plant on said stake body means and maintain said plant proximate to said above-ground portions thereof;

wherein said cavity means is filled with fertilizer in said subsoil portion of said stake body means and with pesticide in said above-ground portions of said stake body means; and

wherein said cavity means is further defined by first and second abutting internal partition means formed at opposed respective positions in said first and second stake body sections to thereby define a plurality of cavities between said partitions corresponding to said subsoil and above-ground portions.

4,021,966

PLANTCUP ELEMENT

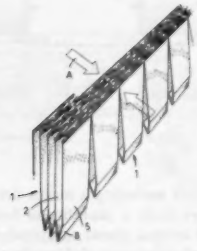
Heikki Rimpinen, and Martti Kohonen, both of Mantta, Finland, assignors to G.A. Serlachius Oy, Mantta, Finland

Filed Apr. 8, 1976, Ser. No. 675,209

Claims priority, application Finland, Apr. 15, 1975, 751110

Int. Cl.² A01G *9/02*

U.S. Cl. 47—86 **4 Claims**



1. A plant cup element comprising a plurality of adjoining plant cups, each having four bounding planar walls arranged in first and second opposed pairs and defining a mouth opening, each said cup having an operating position in which the cup is expanded and has a rectangular cross-section, said first pair of opposed walls being provided with longitudinal fold lines to permit the cup to collapse into a folded state by folding of said first pair of walls in V-form when the cup is compressed in a direction perpendicular to the second pair of walls, said walls of two adjoining cups provided with the fold lines being connected together at corner points of the mouth openings of the cups, each said cup having a bottom disconnected from said first pair of walls with the fold lines and connected to said second pair of walls along lateral fold lines, said bottom having a central fold line parallel to said lateral fold lines.

4,021,967

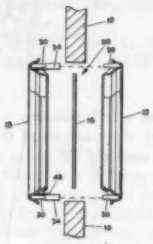
DOOR LIGHT FASTENER

Garvin Mulder; Norman Machiela, both of Holland, and George T. Saunders, East Grand Rapids, all of Mich., assignors to ODL, Incorporated, Zeeland, Mich.

Filed Nov. 10, 1975, Ser. No. 630,178

Int. Cl.² E06B *3/58*

U.S. Cl. 49—171 **12 Claims**



11. Fastener means for mounting a door light in a door light opening in a door, wherein the door light comprises a molded plastic frame having an outer edge designed to engage the edge of the door light opening and an inner edge that engages a sheet of light transmitting material, the frame being formed in two sections that fit over each side of the door light opening, the sections of the frame including a plurality of pairs of opposed, inwardly extending bosses, said fastener means comprising tubular clip means having open ends that fit over the inner ends of each pair of opposed bosses so as to resiliently hold the door light sections together when they are pressed together on a door light opening in a door.

4,021,968

COUNTERBALANCING HINGE FOR RANGE OVEN DOORS OR THE LIKE

Willard E. Kendall, 1034 Bayside Road, Willow Lake Estates, Elgin, Ill. 60120

Filed May 14, 1976, Ser. No. 686,481

Int. Cl.² E05F *1/10*

U.S. Cl. 49—386 **35 Claims**

1. A counterbalancing hinge assembly adapted to mount a door in closing relation to an opening in the body structure of an appliance and from which the door must be capable of swinging to an open position about an axis along the bottom edge of the opening, comprising:

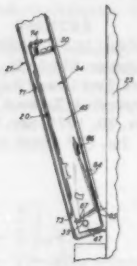
articulated members including a supporting bracket adapted to be secured to the body structure adjacent to one side of the bottom edge of the body structure opening and a generally upwardly extending elongate hollow frame arm adapted to be slidably removably received within a downwardly opening fixed socket in the door by longitudinal relative assembly of the hollow frame arm in the socket;

said bracket a body portion for fixed attachment to said appliance body structure and an arm portion projecting

from said bracket body portion into the lower end of said hollow frame arm;

means pivotally connecting said lower end of the hollow frame arm to the bracket arm portion for supporting the arm and door on said bracket arm portion and for swinging of the hollow frame arm between a generally upright closed door position and a generally horizontal open door position;

an elongate counterbalancing spring within said hollow frame arm and having an upper end connected to the upper end of the hollow frame arm;



and mechanism which remains wholly within said hollow frame arm in all positions of the hollow frame arm and functions to connect the lower end of said spring to said bracket arm portion within said hollow frame arm;

said mechanism being operative in the upright position of the hollow frame arm to cause the spring to bias the hollow frame arm toward the closed door position;

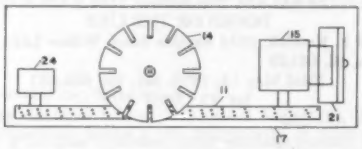
said mechanism also being operative to cause the spring to counterbalance the door throughout the range of movement of the hollow frame arm and the door between a partially open door position and a fully open door position.

4,021,969

OBSERVABLE WORKPIECE ABRADING MACHINE

James R. Davis, Jr., 348 Chesterfield Circle, Dayton, Ohio 45431

Filed Mar. 1, 1976, Ser. No. 662,347
Int. Cl.[2] B24B *21/00*
U.S. Cl. 51—135 R 1 Claim



1. Apparatus for abrasive machining the surface of material to produce a finish, which comprises:

a. a workpiece platen comprising a disc rotatable about an axis perpendicular to said pulleys and having spaced perforations for periodic alignment with the perforation of the belt;

b. means for maintaining level of belt tension;

c. a perforated rotatable disc periodically aligned with the perforations of the belt to permit continual observation of the workpiece;

d. a base to support the belt in intimate parallel contact with the rotatable disc; and

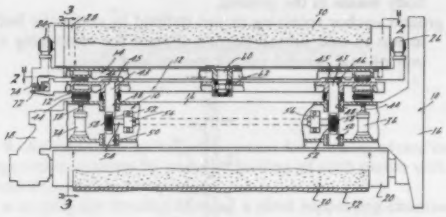
e. means for driving the belt and the disc.

4,021,970

WIDE ABRASIVE BELT TENSION AND OSCILLATION ASSEMBLY

Witold C. Przygocki, Southfield, Mich., assignor to Acme Mfg. Company, Ferndale, Mich.

Filed Feb. 19, 1976, Ser. No. 659,228
Int. Cl.[2] B24B *21/18*
U.S. Cl. 51—148 4 Claims



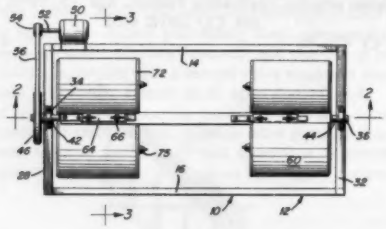
1. A belt tension and oscillation assembly for wide abrasive belt applications comprising a relatively stationary main frame, a contact roll mounted on said main frame, a first support frame mounted on said main frame for linear movement relative thereto, a second support frame mounted on said first support frame for pivotal movement relative to said first support frame and for linear movement with said first support frame relative to said main frame, an idle tension roll mounted on said second support frame, a continuous abrading belt mounted on said rolls, and means interconnecting said main, first and second frames, said last-named means including a pivot connection between said first and second support frames located substantially midway between the ends thereof permitting pivotal movement of said second frame relative to said first support frame, bearing supports interposed between said first and second support frames adjacent the ends thereof to support said second support frame and said idle roll during pivoting thereof, and means to effect relative linear movement between said main frame and said first and second support frames to apply uniform belt tension to said belt.

4,021,971

MULTI-DRUM GEM TUMBLER

Roy W. McFadden, 1202 Ennis, Plainview, Tex. 79072

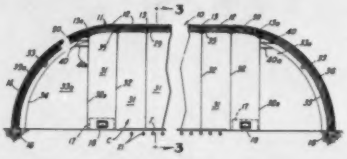
Filed Feb. 12, 1976, Ser. No. 657,632
Int. Cl.[2] B24B *31/02*
U.S. Cl. 51—164 4 Claims



1. A gem tumbler including a motor driven, slowly turning horizontal support shaft, a plurality of hollow receivers supported from and spaced about said shaft for rotation therewith, a plurality of cylindrical, deformable and resilient drums removably and snugly received within said receivers and supported therefrom against deformation, said drums generally paralleling said shaft and including means defining access openings therein for the entrance of material to be tumbled in said drums and the discharge of tumbled material therefrom, a removable closure for each of said access openings, said

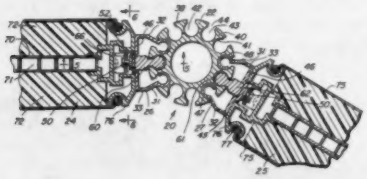
shaft including a plurality of outwardly offset support shank portions extending longitudinally thereof with each shank portion having at least one free end, said receivers including sleeve means removably endwise telescoped over said free ends of said support shank portions and releasably anchored thereto.

4,021,972
AIR SUPPORTED, MULTI-WALL, INSULATED STRUCTURE AND PROCESS OF PRODUCING SAME
James Edwin Choate, 260 Pine Valley Road, Marietta, Ga. 30060, and John Robson Hall, 4041 Randall Mill Road, Atlanta, Ga. 30327
Filed July 9, 1975, Ser. No. 594,597
Int. Cl.² E04B *1/34*
U.S. Cl. 52—2 **27 Claims**



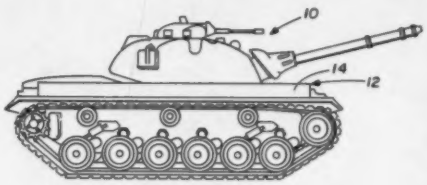
1. An air supported structure comprising:
a. a first flexible, imperforate wall shaped to form an envelope capable of being supported, in ambient air, by air at a pressure within said envelope greater than the pressure of the ambient air;
b. a second perforate, flexible wall disposed adjacent to but spaced from said first wall, said second wall being provided with pores or openings throughout substantially the entire area of said second wall so as to be pervious at all times to the free passage of air and moisture, therethrough; and
c. means for connecting said first flexible wall and said second flexible wall for defining an insulating material receiving space therebetween;
d. there being provided for the aforesaid walls, an opening, larger than the pores or openings of said second wall, and through which a light-weight aggregate insulating material may be blown to fill the space between said walls.

4,021,973
PARTITION SYSTEM
Thomas R. Hegg, Michigan City, Ind., and Kenneth E. Reinhard, Severna Park, Md., assignors to Interstate Industries, Inc., Mundelein, Ill.
Filed May 27, 1976, Ser. No. 690,409
Int. Cl.² A47G *5/00, 29/02*
U.S. Cl. 52—36 **9 Claims**



1. In a partition system comprising
an elongated standard including a central hub and a plurality of wall means extending radially outwardly of said hub, said wall means defining a plurality of parallel longitudinally extending keyways generally coextensive with the standard, each said keyways including an elongated hollowed out inner chamber and an elongated passageway narrower than said inner chamber and communicating therewith, said passageway opening radially outwardly of the standard,
an upstanding panel, and
securement means for releasably securing said panel to the standard;
the improvement wherein said securement means comprises
a bracket including a pair of elongated spaced parallel rails adapted for cooperative slidable longitudinal insertion within a corresponding pair of said inner chambers of the keyways in the standard, said bracket further including a yoke joining said rails, said yoke being formed with a transverse through opening;
pin means and means detachably affixing said pin means to the standard, said pin means being adapted to project through the opening in said yoke; and
clip means affixed to an end face of said panel, said clip means being adapted to engage said pin means releasably, thereby to secure the panel to the standard.

4,021,974
CAMOUFLAGE DISRUPTER FRAME
Wayland C. Edwards, Garland, Tex., assignor to Varo, Inc., Garland, Tex.
Filed Mar. 5, 1976, Ser. No. 664,271
Int. Cl.² E04B *1/347;* **A45F** *1/04*
U.S. Cl. 52—63 **18 Claims**



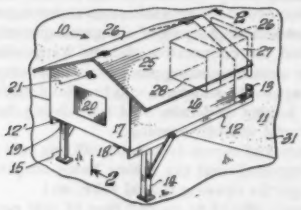
1. A camouflage disrupter comprising:
a frame including a plurality of pivotally connected links movable between closed and open positions, said links defining a compact configuration when in the closed position and defining a predetermined planar geometric shape when in said open position, and
an integral bow member connected at both ends to said frame and normally pivoted at both ends relative to said links for maintaining a planar configuration in a plane parallel to the planes of said frame when in the closed position, said bow member automatically movable to a flexed bent position away from said planar geometric shape of said frame to provide a three dimensional disrupter frame when said links are moved to said open position.

4,021,975
PET HOUSE
William W. Calkins, 610 S. Olive, La Habra, Calif. 90631
Filed Apr. 2, 1976, Ser. No. 668,184
Int. Cl.² A01K *1/00*
U.S. Cl. 52—64 **4 Claims**

1. A pet house useful for freeing a residence from the odors eminating from a litter box while allowing the litter box to be accessible to a pet from within the residence, said pet house comprising:
an entry way tunnel having a first end within a residential building and being held in weather tight connection therewith, the lower surface of the tunnel being near the floor of the residential building;
a vapor impervious barrier located within said tunnel, said barrier being hinged to permit a pet to pass through said tunnel;

a weatherproof, ventilated and enclosed pet house affixed to the other end of said tunnel;

a litter box within said pet house; and



means for opening said pet house to permit the removal, cleaning and replacing of said litter box.

4,021,976

PREFABRICATED STRUCTURES FOR BUILDINGS

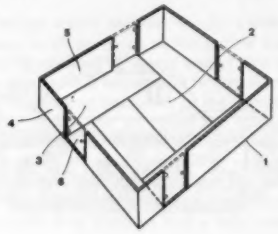
Libero Colma, P.za Garibaldi 8, 20066 Melzo (Milan), Italy

Filed June 19, 1975, Ser. No. 588,471

Claims priority, application Italy, Feb. 11, 1975, 20144/75

Int. Cl.² E04H *1/00*

U.S. Cl. 52—79.7 **4 Claims**



4. A building, comprising a plurality of substantially identical three-dimensional trihedron-shaped prefabricated modular elements each having an elongated rectangular slab, a first wall projecting upwardly from one narrow side of said slab and a second wall projecting upwardly from one large side of said slab and having a free end portion extending from said first wall towards but short of the other narrow side of said slab, said three-dimensional elements being arranged closely adjacent one another and together bounding an interior building space the floor, ceiling and side walls of which are at least partly formed by the cooperating walls and slabs of said three-dimensional elements, each of said free end portions defining with a wall of another of said elements a gap serving for the installation of doors and/or windows.

4,021,977

REUSABLE YIELDING POST SUPPORTS

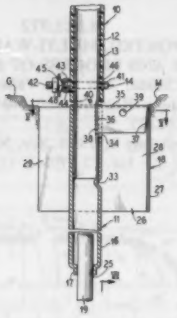
Robert F. Deike, Cheyenne, Wyo., assignor to Foresight Industries, Cheyenne, Wyo.

Filed Mar. 19, 1976, Ser. No. 668,699

Int. Cl.² F16B *31/00*

U.S. Cl. 52—98 **20 Claims**

1. A reusable yielding ground anchored post assembly which comprises a ground anchor having a tubular barrel with a reduced leading driving end and a plurality of radial fins on the trailing end thereof together with an internal abutment adjacent the driving end adapted to be impacted by a driving tool for forcing the anchor into the ground to a depth for submerging the fins on the trailing end, a reusable break-away tube having a lower end telescoped in the upper end of said barrel and an upper end projecting from the barrel, a post telescoped over the upper end of said break-away tube, releasable first means selectively locking the break-away tube to the barrel, releasable second means selectively locking the post to the break-away tube, said break-away tube having a fracture zone adjacent the upper end of the barrel to accommodate swinging of the post from an upright position to a horizontal position on the ground when the post receives an impact blow sufficient to fracture said tube, said break-away tube having a nondeforming removable fitting relation with said barrel and



post, said first and second means being releasable to permit easy removal of the break-away tube from said barrel and post after fracture of said tube, said tube having a reusable length remaining after fracture for relocking in said barrel and post by said first and second means, and said reusable length of said tube adapted to be weakened between said barrel and post to provide a fracture zone.

4,021,978

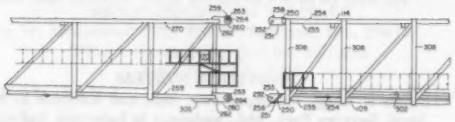
MAST ASSEMBLY

Ralph Busse; Hermus C. Moore, Jr., and Raymond L. Welch, all of Pampa, Tex., assignors to Cabot Corporation, Boston, Mass.

Division of Ser. No. 407,098, Oct. 17, 1973, Pat. No. 3,942,593. This application Feb. 25, 1976, Ser. No. 661,394

Int. Cl.² E04H *12/18*, *12/10*

U.S. Cl. 52—118 **3 Claims**



1. A telescoping, nestable multiple-section mast assembly, said mast assembly having a generally rectangular cross-section, an open V-door side and a closed drawworks side, said mast assembly being adapted for extension and retraction in a substantially horizontal condition with the V-door side up and comprising at least two mast sections, including a lower base mast section and an upper crown mast section;

each mast section of said assembly comprising four mast leg members defining the corners thereof and extending in a substantially mutually convergent manner from the lower base end to the upper crown thereof;

the crown ends of each of said mast leg members of each lower mast section corresponding to and being in concentric and in-line arrangement with the base ends of the corresponding mast leg members of the adjacent upper mast section;

connector means between each of said lower and upper mast leg members, each of said connector means comprising

a female connector bracket comprising at least a pair of parallel spaced apart side plate members affixed to and

extending from the end of one of the mast leg members, said side plate members being disposed vertically and substantially equidistantly bracketing the extended centerline of said one of the mast leg members with the mast assembly in the horizontal V-door-side-up condition, and a ramp element located between said side plate members, said ramp element being adapted to engage and provide vertical guidance to the corresponding male connector bracket of the other of said mast leg members during extension and retraction of the mast assembly, and

a corresponding male connector bracket comprising at least one plate element affixed to and extending from the end of the other of said mast leg members, said male connector bracket being disposed substantially along the extended centerline of said other of said mast leg members and each of the plate elements thereof being adapted for engagement into a corresponding space between the side plate members of said female connector bracket;

connector pin receiving apertures through said side plate members and plate element of said female and male connector brackets, said apertures being located so as to be coaxially aligned with one another upon establishing said one and said other of said mast leg members in their extended, concentric and in-line arrangement with one another, and

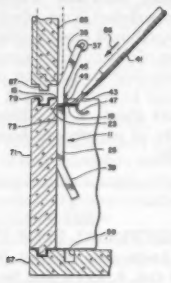
pin connector means adapted for insertion into said coaxially aligned apertures.

4,021,979

ALIGNING BRACKET FOR UNDERGROUND SECTIONAL PRECAST CONCRETE STRUCTURES AND METHOD OF ASSEMBLY

Donald H. Rez, Newport Beach, Calif., assignor to Associated Concrete Products, Inc., Santa Ana, Calif.

Filed June 21, 1976, Ser. No. 698,460
Int. Cl.² E02D *35/00;* **E04B** *1/35;* **E04G** *21/16*
U.S. Cl. 52—127 **15 Claims**



1. An alignment member for use in assembling sections of underground precast structures, comprising:

an elongate main body section;

a support flange extending normal to the axis of said main section adjacent one end of said main body section;

an engagement member mounted on said main body section between the support flange and the longitudinal center of said main body portion, said engagement member comprising means for aligning said alignment member in the right angle corner of said sections of said underground precast structures, said aligning means comprising a pair of edges on said engagement member each extending at a 45° angle from a side of said main body section; and

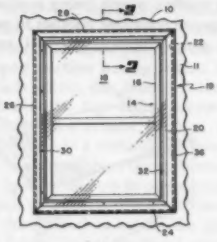
an elongate camming member extending from the end of said main body member adjacent said support flange, said camming member including a camming surface inclined relative the axis of said main body portion in a direction opposite said support flange.

4,021,980

STORM WINDOW

Frank R. Wilfong, 5622 Lester Road, Cincinnati, Ohio 45213

Filed Aug. 8, 1975, Ser. No. 602,989
Int. Cl.² E06B *3/26*
U.S. Cl. 52—202 **6 Claims**



1. A storm window arrangement mountable on an external wall surface of a building over and spaced from a primary paned window recessedly mounted in an opening in the wall and set back from the external wall surface, said storm window arrangement being of multi-part construction, including a window pane, a multi-part mounting support for said window pane including three elongated channel shaped members securedly mounted on the external wall surface surrounding the periphery of the wall opening on three contiguous sides, and presenting a fixed three-sided frame having an inner, inwardly opening, continuous channel on said three sides, said frame having an open fourth side, said window pane being edgewise slidably insertable through said open side into, and supportable in and by, said continuous channel in a mounted position over and covering the wall opening and spaced therefrom, said window pane as mounted additionally covering and being spaced from and with respect to said primary paned window, said window pane being removable from said continuous channel, a fourth elongated channel shaped member similar to the first three said channel shaped members, said first three channel shaped members having a size and channel depth providing a friction fit for the window pane, with the lengths thereof being sized to closely fit the window pane in height and width, said fourth channel shaped member constituting a closure for the open fourth side and forming with the other three a continuous closed channel enclosing and supporting said window pane, said fourth member being removably mounted on and frictionally supported on and by the exposed edge of said window pane subsequent to placement thereof in the three-sided channel, sealing means between said channel members and said wall, and a friction seal between all said channel shaped members and said window pane.

4,021,981

INSULATED WATER IMPERMEABLE ROOFING SYSTEM

John D. Van Wagoner, McLean, Va., assignor to Robert M. Barlow, Fairfax, Va., a part interest

Division of Ser. No. 555,596, March 5, 1975, Pat. No. 3,971,184. This application Mar. 5, 1976, Ser. No. 664,080
Int. Cl.² E04D *1/28*
U.S. Cl. 52—309.13 **11 Claims**

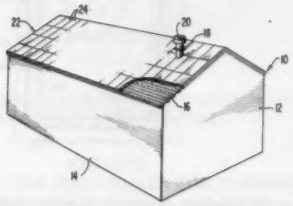
1. An insulated, water impermeable, roofing system for insulating the interior of a building from ambient thermal cycling and for insuring water impermeable integrity of a roof portion of the building, said roofing system comprising:

an array of factory assembled, laminar roofing panels self bonded to a roof deck, said panels each including,

a water and vapor impermeable membrane, said membrane being plastic and self-adherent under normal ambient temperature conditions, wherein one surface of said membrane is self bonded to said roof deck, and

an insulation course coextensively overlying said water and vapor impermeable membrane and having one surface fixedly bonded to the other surface of said water and vapor impermeable membrane, said insulation course serving to isolate the water and vapor impermeable membrane as well as the interior of the building from ambient thermal cycling;

said laminar roofing panels being mutually juxtaposed but laterally spaced from one another to provide a peripheral expansion zone around each panel; and



a water and vapor impermeable compound injected into said peripheral expansion zone around each laminar roofing panel, said compound being plastic and self-adherent under normal ambient temperatures and being bonded to the roof deck between adjacent laminar roofing panels, as well as the water and vapor impermeable membrane and insulation layers of each roofing panel, to form a water and vapor impermeable barrier across the entire roof deck and concomitantly to form a plastic expansion joint about the peripheral edges of each of said laminar roofing panels.

4,021,982

HEAT INSULATING WALL STRUCTURE FOR A FLUID-TIGHT TANK AND THE METHOD OF MAKING SAME

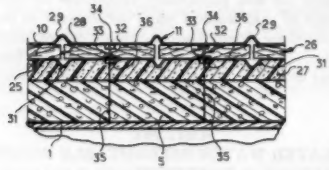
Michel Kotcharian, Paris, France, assignor to Technigaz, Paris, France

Continuation of Ser. No. 542,509, Jan. 20, 1975, abandoned. This application June 17, 1976, Ser. No. 697,038

Claims priority, application France, Jan. 24, 1974, 74.02425; Sept. 27, 1974, 74.32737

Int. Cl.² E04B *1/62;* **E04C** *2/32*

U.S. Cl. 52—410 **22 Claims**



1. A fluid-tight and heat insulating wall structure for a fluid-tight heat insulated tank, comprising a self-supporting and rigid outer wall, a fluid-tight primary barrier consisting of a substantially flexible membrane-like impervious inner wall spaced from said outer wall; and an intermediate heat insulating structure, a fluid-tight secondary barrier embedded in said heat insulating structure, fastening means to secure said intermediate heat insulating structure to said inner wall and to said primary barrier, said intermediate heat-insulating structure and said fastening means being capable of transferring loads from said primary barrier to said outer wall, said primary barrier being applied against and supported by said intermediate heat insulating structure, said inner wall of said primary barrier being made from thin corrugated sheet metal formed with at least one set of spaced substantially parallel corrugations projecting inwards from the inside only; said intermediate heat insulating structure including from the inside towards the outside; (i) a separating layer of a heat-insulating and load distributing material selected from the group consisting of balsa wood, plywood and rigid cellular materials, said separating layer being in continuous contact with said fluid-tight secondary barrier and secured thereto and comprising at least one set of spaced substantially parallel slots each extending through at least a major part of the thickness of said separating layer and each located substantially at a corrugation of said primary barrier and extending along the said corrugation, (ii) the aforesaid fluid-tight secondary barrier (iii) at least one heat insulating layer.

4,021,983

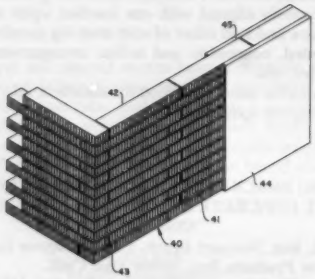
HONEYCOMB BUILDING WALL CONSTRUCTION

James D. Kirk, Jr., 40 N. Tower Road, Oak Brook, Ill. 60521

Filed Feb. 9, 1976, Ser. No. 656,293

Int. Cl.² E04B *5/52*

U.S. Cl. 52—451 **10 Claims**



1. A building wall structure comprising a plurality of paperboard honeycomb layers adhesively secured to each other in vertical arrangement; each said honeycomb layer having a central core of paperboard honeycomb cells having vertical cell axes and a paperboard closure sheet essentially covering the top and bottom of said core, the opposite long sides of said central core honeycomb being open on each side; the top closure sheet of one honeycomb layer adhesively secured to the bottom closure sheet of an adjacent honeycomb layer forming a plurality of paperboard honeycomb layers to the desired wall height.

4,021,984

SECTIONAL EDGE STRIP

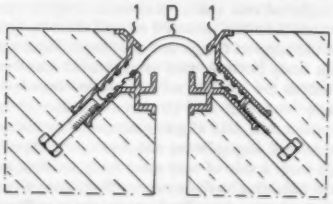
Heinz Honegger, Lochmuhle, Rorbas, Switzerland (CH8427)

Filed Oct. 8, 1975, Ser. No. 620,646

Claims priority, application Switzerland, Oct. 19, 1974, 13996/74

Int. Cl.² E04C *1/34*

U.S. Cl. 52—471 **10 Claims**



1. A sectional edge strip for casting integrally with a concrete shape comprising; a jointing strip groove adapted to take

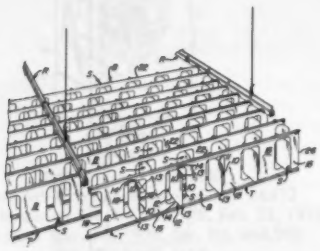
the edge of an elastic jointing strip, said edge strip having at least one side which is adjacent the mold during the production process of the concrete shape with two screw receiving grooves having their axes at right angles extending along its entire length into which fixing screws can be screwed at right angles to each other at freely selectable points, so that the two sides of the sectional edge strip which are to adjoin the mold can be, for at least the duration of the concrete casting operation, secured to two parts of the mold disposed at right angles to each other.

4,021,985

ILLUMINATOR GRIDS AND METHOD OF FORMING BAFFLES THEREFOR

Charles U. Deaton, Genessee Mountain, Golden, Colo. 80401

Filed Dec. 8, 1975, Ser. No. 638,617
Int. Cl.² E06B 7/08
U.S. Cl. 52—473 17 Claims



1. An illuminator grid for disposition below one or more light sources and for intercepting light rays directed downwardly but at angle less than a predetermined angle to the horizontal from said light sources, comprising:

a series of coplanar, upright primary baffles disposed in spaced, parallel relation;

a series of upright, longitudinally spaced secondary baffles, each extending laterally to each side of the corresponding primary baffle and interspaced in position with the secondary baffles of the adjacent primary baffle;

said primary baffles having separated apertures corresponding to the shape of said secondary baffles and through which said secondary baffles extend;

said primary baffles being spaced apart a distance such that the upright edges of said secondary baffles of one primary baffle extend to or past the upright edges of said secondary baffles of an adjacent primary baffle, in the direction of said secondary baffles; and

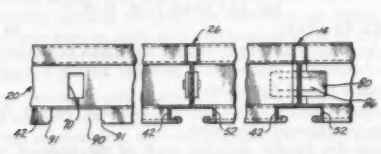
means connecting the top and bottom of each said secondary baffle with the corresponding primary baffle.

4,021,986

MODULAR CEILING FRAMEWORK

Francis L. McCall, Hacienda Heights, and Joel E. Taylor, III, Pasadena, both of Calif., assignors to Specified Ceiling Systems, Alhambra, Calif.

Filed Apr. 18, 1975, Ser. No. 569,287
Int. Cl.² C04B 5/52
U.S. Cl. 52—475 3 Claims



1. A drop ceiling comprising a plurality of longitudinal frame members, each member being formed from a single flat sheet metal strip, each member being formed in cross-section with a rectangular shaped hollow tubular portion, a flat web portion in the form of two thicknesses of sheet metal strip projecting from the center of one side of the tubular portion, and a pair of L-shaped portions each having one horizontal leg extending outwardly from a side of said flat web portion opposite from the other horizontal leg, and a vertical leg extending parallel to but in the opposite direction from said flat web portion to form a channel-shaped portion, the outer margins of the channel-shaped portion having folded lips projecting inwardly toward each other, the lateral extent of the outwardly extending horizontal legs being substantially greater than the lateral width of the tubular portion, and means for joining the frame members in a rectangular open network, the intersections of the frame members being formed by connecting the ends of two frame members to opposite sides of a third member to form a pair of T-joints at spaced intervals along the third member, the third member having the parallel vertical legs and associated folded lips of the two L-portions notched at each intersection with the adjoining two members, each of the adjoining members at an intersection having the folded lips projecting beyond the ends of the associated L-shaped portions so as to fit between the notched edges of the adjoining folded lips of the third member with the ends of the associated L-shaped portions abutting edgewise against the sides of the parallel vertical legs of the third member at the margins of the notches in the parallel vertical legs of the third member, each of the two frame members being terminated in a connector tab formed extending and offsetting a portion of the two thicknesses of the web longitudinally beyond the rectangular portion and the L-shaped portions, the tab extending parallel to but offset from the longitudinal major surfaces of the associated flat web portion, the connector tabs of said two frame members extending through an opening in the flat web portion of the third member from opposite sides in overlapping relationship, the tabs having intergral fingers projecting from the tab and engaging the flat web portion adjacent the opening to lock the members together, and panels supported in the rectangular openings of the framework the margins of the panels being notched to receive the L-shaped portions so that the panels are supported on the outwardly projecting horizontal legs of the L-shaped portions and the outer surface of the panels is flush with the folded lips.

4,021,987

TIE BEAMS AND GIRDERS FOR FACADES

Fritz Schnebel, deceased, late of Greimelberg, Germany; by Elfriede Johanna Schnebel, inheritor, 8201 Greimelberg 4, Germany, and Johann Staber, Favoritenstrasse 7, Vienna, Austria

Filed July 16, 1975, Ser. No. 596,535
Int. Cl.² E04B 2/88
U.S. Cl. 52—495 7 Claims

1. A tie beam assembly comprising:

a core section consisting of at least two tie beam sections,

means for interfittingly connecting said sections together for displacement relative to each other,

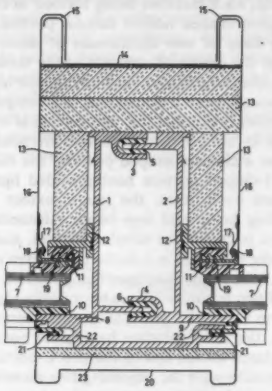
an inner steel plate facing, an outer steel plate facing and said steel plate facings covering all exposed surfaces of said tie beam sections,

at least one preformed element and at least one integral element carried in spaced opposed fashion on at least one unexposed surface of said tie beam sections for mounting panels, panes of glass and the like on at least one side of said tie beam assembly,

said tie beam sections being formed of aluminum,

means for sealing said tie beam sections together at said interfitting means, and

a fire-resistant material provided on the inner side of said



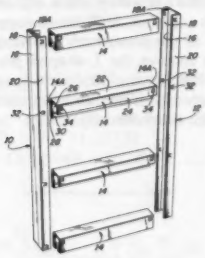
steel plate facings and acting as a fire protective means for the aluminum tie beam sections.

4,021,988

METAL FRAME CONSTRUCTION

James A. Edeus, Rock Falls, and James R. Johnston, Sterling, both of Ill., assignors to National Manufacturing Company, Sterling, Ill.

Filed June 16, 1976, Ser. No. 696,783
Int. Cl.² E06B *3/04*
U.S. Cl. 52—656 **6 Claims**



1. A metal door frame, comprising

first and second upright channel members each having a web and two parallel side flanges,

a plurality of cross channel members each having a web and two parallel side flanges, said upright channel members being disposed in mutually parallel relationship,

said cross channel members being respectively disposed in perpendicular relationship to said upright channel members,

the end portions of said cross channel members being disposed within respective ones of said upright channel members abutting the webs of said upright channel members and with the faces of the adjacent said flanges of said upright and cross channel members being in mutual engagement,

said upright channel members each having a plurality of tongue portions integral with said side flanges and extending through respective openings in the adjacent ones of said side flanges of said cross channel members,

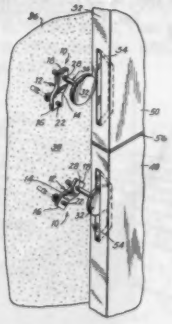
said tongue portions being curled under said side flanges of said cross channel members to secure said cross members to said upright members and to hold the ends of said cross channel members in abutment with the webs of said upright members.

4,021,989

ROTATABLY PIVOTAL STONE ANCHOR AND STONE ANCHOR CONSTRUCTION SYSTEM

Alfred A. Hala, Islip, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,866
Int. Cl.² E04B *1/38*
U.S. Cl. 52—713 **21 Claims**



1. A stone anchor apparatus for interconnection between the inner wythe and the outer wythe of a wall construction,

said stone anchor comprising

a central portion,

a first end portion, and

a second end portion,

said first end portion being secured to said central portion and having a disc tie detachably secured thereto,

said disc tie being capable of lateral adjustment with respect to said first end portion,

said second end portion being secured to said central portion and having means capable of pivotal securement with respect to said inner wythe,

said central portion and said first end portion being pivotally rotatable about said pivotal securement means of said second end portion for vertical and horizontal adjustability of said first end portion, and

said disc tie having effective vertical, horizontal and lateral adjustability.

4,021,990

VENEER ANCHOR AND DRY WALL CONSTRUCTION SYSTEM AND METHOD

Bernard J. Schwalberg, Brooklyn, N.Y., assignor to Hohmann & Barnard, Inc., Hauppauge, N.Y.

Filed Jan. 27, 1976, Ser. No. 652,867
Int. Cl.² E04B *1/38, 1/16*
U.S. Cl. 52—714 **34 Claims**

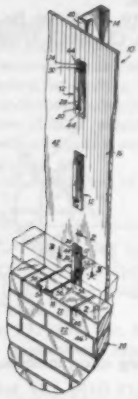
1. An improved veneer anchor apparatus comprising

a substantially planar plate member having a longitudinal and a lateral dimension,

a longitudinally extending bar member having first and second spaced apart ends,

means for fixedly securing each of the ends of said bar member to said plate member in a manner whereby said bar member is disposed forwardly of said plate member in substantially parallel relationship therewith, and

said plate member and said bar member form a slot therebetween.



4,021,991

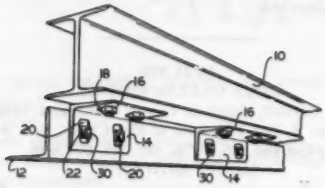
FASTENING DEVICE

Roger W. Hotz, Ash Drive, Northford, Conn. 06472

Continuation-in-part of Ser. No. 551,778, Feb. 21, 1975. This application Mar. 15, 1976, Ser. No. 666,950

Int. Cl.[2] F16B 7/18

U.S. Cl. 403—388 22 Claims



1. Fastening means for rigidly locking a first member relative to a second member wherein said members are provided with surfaces of engagement permitting adjustment relative to each other, said members being normally subjected to external forces tending to shift them relative to each other in one direction, said fastening means comprising in combination

a tapered segment having oppositely disposed faces, a longitudinal axis intersecting said faces and working surfaces intermediate said faces extending generally in the direction of said longitudinal axis, said working surfaces being tapered along said axis toward one of said face, such that said segment at said one face is narrower than at the other,

said first member having an elongated slot in its said engagement surface with longitudinal walls spaced to receive said segment such that said working surfaces of said segment engage said walls of said slot, said slot extending generally parallel to said one direction in which said members tend to shift, said longitudinal walls of said slot converging in said one direction at a predetermined angle, and

locking means fixedly supported by said second member and adapted and arranged to force said working surfaces of said segment into wedging engagement within said slot at an adjusted position along the length thereof in order to positively lock said members together at such adjusted position.

4,021,992

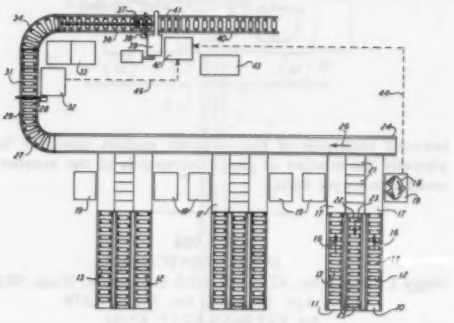
IN-LINE SYSTEM OF PACKAGING, SECURING, AND WEIGHING

Walter Charles Spaude, Milwaukee; Thomas Duane Wichman, Franksville; Michael Thomas Corrigan, and Jimmie Carl Joannon, both of Racine, all of Wis., assignors to J. I. Case Company, Racine, Wis.

Filed July 6, 1976, Ser. No. 702,480

Int. Cl.[2] B65B 13/02

U.S. Cl. 53—3 6 Claims



1. A method of packaging, securing, and weighing items in various containers, comprising the steps of placing said items in respective containers at a packaging station, moving said containers along an in-line system in a continuously apparatus-supported manner by operating and arranging a first conveyor to extend from said station and to a location remote from said station and to a location across the operating path of a first photo-electric eye arranged to be operatively associated with and for operation of said first conveyor, placing said containers on said first conveyor for movement to said first photo-electric eye path, operating and arranging a first weighing scale in container-flow communication with said first container and adjacent to said photo-electric eye, weighing said containers on said first scale and marking the weight thereon and selectively removing some of said containers from said in-line system and passing other of said containers along said system, operating and arranging a second conveyor in continuous apparatus-supported container-movement communication with said first scale to extend from said first scale and to a location remote from said first scale and to a location across the operating path of a second photo-electric eye arranged to be operatively associated with and for operation of said second conveyor, placing said other containers on said second conveyor and arranging for movement of said other containers along said in-line system to said second photo-elctric eye path, banding said other containers, operating and arranging a second weighing scale in container-flow communication with said second conveyor and adjacent to said second photo-electric eye, and weighing the banded said other containers on said second scale and marking the weight thereon.

4,021,993

APPARATUS FOR APPLYING A WRAPPER

René Widmer, Grossmannstr. 31, 8049 Zurich, Switzerland

Filed May 1, 1975, Ser. No. 573,526

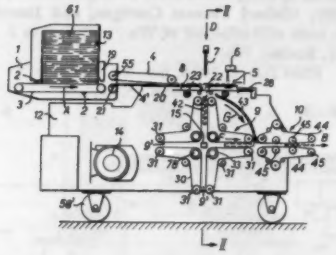
Claims priority, application Switzerland, May 7, 1974, 6168/74

Int. Cl.[2] B65B 63/04

U.S. Cl. 53—120 9 Claims

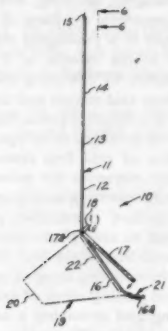
7. A folding drum for applying a wrapper to sheets of paper comprising a rotational axis, rotatable supporting means secured to said rotational axis, a plurality of endless conveyor belts, a number of pulleys for each of said endless conveyor belts secured to said supporting means in such positions that

each endless conveyor belt cooperates with two adjacent endless conveyor belts in the formation of one folding gap



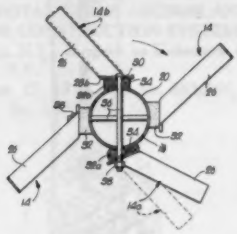
between each pair of two adjacent endless conveyor belts whereby the number of gaps corresponds to the number of endless conveyor belts.

4,021,994
SCOOP DEVICE
Peggy L. Mainprice, 4210 NE. 85th St., Seattle, Wash. 98115
Filed Apr. 15, 1976, Ser. No. 677,378
Int. Cl.² B65B *67/12, 67/04*
U.S. Cl. 53—390 **2 Claims**



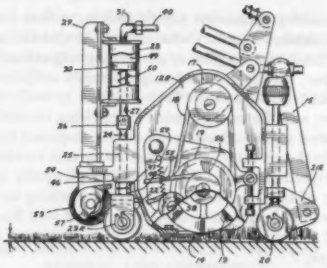
1. A scoop device, comprising in combination, a tool and a detachable bag mounted on said tool, said tool comprising an elongated handle, a circular rim secured to said handle, said detachable bag being removably received upon said rim, a pivotable bag clamp attached to said handle, and means secured to said clamp for pivoting said clamp away from said rim by thumb pressure, said handle being comprised of an upper and a lower member which are pivotally attached together at their one ends by a locking hinge, said handle lower member being secured fixedly to said bag receiving rim, said bag receiving rim being angularly disposed to said handle lower member and being arcuately curved forwardly at its outer extremity, said rim removably receiving an edge of the periphery of an opening of said bag, and simultaneously receiving an extending lip portion of said bag, said lip portion of said bag extending from beneath the said curved extremity, said edge of said opening of said bag extending externally when said bag is placed upon said rim, said clamp being pivotally secured by a hinge at a lower end of said handle lower member, said clamp springingly engaging said bag edge between its inner periphery, said clamp frictionally urging against the outer periphery of said rim receiving said bag, said clamp comprising an open ring aligned with said rim when pivoted thereagainst so as to hold said bag, said open ring of said clamp at said hinge having a lip extending forwardly at approximately right angle to a plane of said clamp for manual pivoting by a person's thumb.

4,021,995
CROP CONDITIONING ROTOR
Amos Grover Hill, Newton, Kans., assignor to Hesston Corporation, Hesston, Kans.
Filed Nov. 10, 1975, Ser. No. 630,167
Int. Cl.² A01D *57/00*
U.S. Cl. 56—1 **11 Claims**



1. A material handling rotor, including:
a hub;
an outwardly extending rigid element mounted on said hub for rocking movement relative to the latter;
a shock-absorber on said hub spaced from said element; and
structure operably interconnecting said shock absorber and said element for loading the shock absorber uniformly in response to said rocking of said element,
said structure including an elongated member extending through said hub and axially shiftable within the latter,
one end of said member being coupled directly with said rigid element and the opposite end of the member being coupled with said shock absorber whereby movement of said element relative to said hub is transmitted to said shock absorber.

4,021,996
GOLF GREENS MOWER
Gordon E. Bartlett, 1604-½ Laurel Ave., and Michael D. Roach, Rte. 5, Box 126, both of Eau Claire, Wis. 54701
Filed Feb. 26, 1976, Ser. No. 661,696
Int. Cl.² A01D *55/28*
U.S. Cl. 56—7 **8 Claims**



1. In a power driven tractor type riding golf greens mower having a plurality of reel mowing units, each mowing unit having a frame including a pair of parallel spaced apart longitudinally extending end members and supporting a transversely extending, rotatable grass cutting reel and bed plate and a pair of parallel rotary ground engaging means disposed forwardly and rearwardly of the reel, the improvement which consists of a cutting height adjustment on each mowing unit comprising:
A. a pair of spaced apart mounting brackets for one of said rotary ground engaging means fixedly secured to said frame end members,

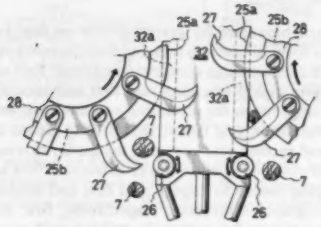
B. a pair of spaced apart support assemblies for the other of said rotary ground engaging means secured to said frame end members for reciprocable vertical movement relative to the frame,
C. a pair of fluid pressure cylinders fixedly secured to said frame above said reciprocable support assemblies, the pistons thereof secured to said support assemblies,
D. a pair of stop means for limiting reciprocable movement of each of said reciprocable support assemblies,
E. a common source of fluid pressure,
F. conduit means connecting said source of fluid pressure to each of said cylinders, and
G. control means regulating flow of fluid through said conduits.

4,021,997

DEVICE FOR CUTTING BRANCHES OR CANES

Shigemitsu Tanaka, Ueda, Japan, assignor to Kabushiki Kaisha Shinko Giken, Ueda, Japan

Filed Nov. 25, 1975, Ser. No. 635,057
Claims priority, application Japan, Nov. 29, 1974, 49-136904
Int. Cl.² A01D *45/02*
U.S. Cl. 56—56 **3 Claims**



1. A device for cutting branches and canes, said device comprising:
a vehicle;
a frame detachably mounted to said vehicle;
a fixed cutter having at least one cutting edge mounted to said frame; and
moving guide means rotatably mounted to said frame adjacent said fixed cutter, said moving guide means comprising:
at least one rotary cutting disk having a cutting edge on its periphery; and
a plurality of pushing members radially mounted to said cutting disk;
wherein said cutting edge of said cutting disk and said pushing members slide along the cutting edge of said fixed cutter thereby cutting the branches and canes forced between said fixed cutter and rotary cutters.

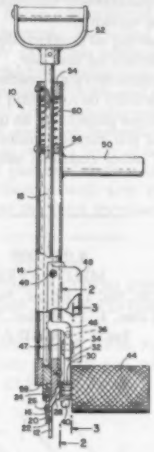
4,021,998

SELF PROPELLED LAWN EDGING SHEARS

Ronald Greenhill, Port Credit, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed May 24, 1976, Ser. No. 689,565
Int. Cl.² A01D *53/12*
U.S. Cl. 56—241 **6 Claims**

1. Self-propelled lawn edging shears comprising stationary shearing blade means having a cutting edge thereon and secured to first shaft means so that the cutting edge of said stationary blade means faces substantially towards said first shaft means, movable shearing blade means having a cutting edge thereon and pivotably positioned with respect to said first shearing blade means so that the cutting edge of said movable shearing blade shearingly engages the cutting edge of said stationary shearing blade, second shaft means longitudinally and slideably secured to said first shaft means, said second shaft means extending substantially the full length of said first shaft means, one end of said second shaft means being pivotally secured to said movable shearing blade means to close said shears when said second shaft means is moved towards said stationary shearing blade means, the other end of said second shaft means terminating in first handle means for grippably receiving fingers, resilient means secured to said first shaft means and said second shaft means for resiliently biasing said first shaft means to said second shaft means, wheel



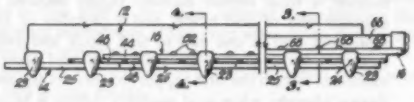
means rotatably mounted on said first shaft, the axis of said wheel means being transverse to the cutting plane of said stationary shearing blade means, ratchet means operatively connected to said wheel means, driving pawl means pivotally connected to the end of said second shaft means and operatively engaging said ratchet means to rotate said wheel means to propel said shears in the direction of the cutting action of said shears when said second shaft is operated to open said shears.

4,021,999

SICKLE ASSEMBLY

Cecil L. Case, Newton, Kans., assignor to Hesston Corporation, Hesston, Kans.

Filed Sept. 18, 1975, Ser. No. 614,482
Int. Cl.² A01D *55/02*
U.S. Cl. 56—298 **4 Claims**



1. In combination with an elongate mounting frame normally disposed in a horizontal position with its longitudinal axis transverse to its normal path of advancement, a sickle assembly comprising:
a plurality of horizontally slotted sickle guards longitudinally spaced along said frame and extending forwardly from the latter;
a sickle slidably carried by said guards and partially disposed within their slots for transverse reciprocation relative to said guards,
said sickle including a plurality of flat, triangular cutter sections and a common bar supporting the sections in a series extending in parallel relationship to said frame,

each of said sections having a pair of forwardly converging cutting edges; and

structure cooperating with the guards for retaining said sickle in proper relationship with said guards during reciprocation,

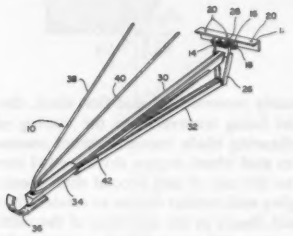
said bar being disposed on top of said section, said structure including a forwardly facing, rear shoulder directly behind and along the bar, and said guards having rearwardly facing, front shoulders directly ahead of and along the bar to present a transversely extending guide channel for the bar above the sections,

said structure having all portions thereof disposed below the uppermost surface of said bar,

each of said sections having a rearmost marginal edge which extends rearwardly beyond said bar,

said marginal edges presenting an upwardly facing, horizontally disposed flat surface underlying said rear shoulder whereby the latter restrains said edges against upward movement.

4,022,000
MILO SAVER
Duane Coxbill, R.R. No. 1, Edgar, Nebr. 68935
Filed Dec. 1, 1975, Ser. No. 636,524
Int. Cl.² A01D *63/00*
U.S. Cl. 56—312 **1 Claim**

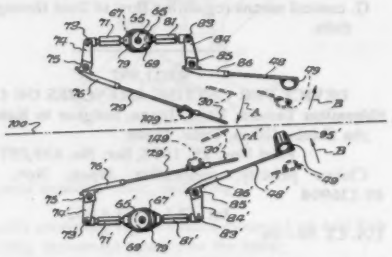


1. An auxiliary device for use in conjunction with a combine to lift flattened cereal stalks upwardly toward the combine for processing, the auxiliary device comprising, in combination:

a first support bracket having means thereon to secure said first support bracket to the combine when the auxiliary device is to be used in combination with the combine, a second support bracket pivotally supported with respect to said first support bracket, a support channel being rigidly secured at one end to the second support bracket and extending outwardly therefrom and terminating in an outward end, a block rigidly secured at one end to the outward end of the channel and extending outwardly thereof, a front runner element rigidly secured to the opposite end of said block, and a plurality of lift bars rigidly secured at one end to said block and extending upwardly and radially outwardly from said point of attachment toward the first support bracket of the auxiliary device whereby when said auxiliary device is secured to the combine for use in combination therewith the assembly from the second support bracket to the runner element will be pivotally supported for vertical movement with respect to the first support bracket so that as the runner moves along the ground the said portion will be free to move vertically in accordance with irregularities in the surface and whereby the flattened cereal grain stalks will be picked up by the lift bars and moved upwardly to a point where they will be brought into the processing area of the combine; and

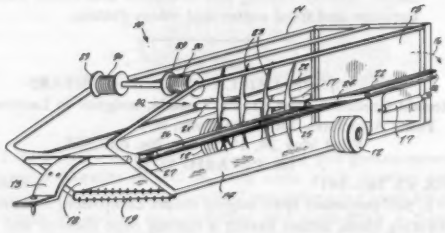
said second support bracket pivotally supported from depending arms rigidly defined on said first support bracket, and a second support channel extending from the second support bracket to the block, said second support channel located above said support channel while converging toward its outward end.

4,022,001
GRAPE HARVESTER
Charles G. Burton, Lewiston, N.Y., assignor to Chisholm-Ryder Company, Inc., Niagara Falls, N.Y.
Filed Feb. 3, 1975, Ser. No. 546,284
Int. Cl.² A01D *46/00*
U.S. Cl. 56—330 **28 Claims**



1. A grape harvester for grapes grown on first and second vines in the form of curtains hanging from laterally spaced first and second cordon wires comprising a frame, first and second vine engaging means engaging said first and second curtains, first mounting means for mounting said first and second vine engaging means on said frame, first driving means coupled to said first and second vine engaging means for driving said first and second vine engaging means to cause said first and second vine engaging means to engage said first and second curtains to harvest grapes therefrom, respectively, first and second wire striker means for purposely striking said cordon wires, second mounting means mounting said first and second wire striker means on said frame, and second driving means coupled to said first and second wire striker means for causing said first and second wire striker means to strike said first and second wires, respectively, to thereby produce a combined vine-engaging and wire-striking action to remove grapes from said vines.

4,022,002
GIANT HAY BALER
John F. Sweeney, Box 1434, Ferndale, Wash. 98248
Filed Aug. 21, 1975, Ser. No. 606,652
Int. Cl.² A01D *89/00*
U.S. Cl. 56—341 **3 Claims**



1. A giant hay baler, comprising in combination, an elongated rectangular frame supported at its rear end upon a pair of wheels, a forward end of said frame including a hitch for being detachably connected to a tractor or other equipment, an opening at said forward end so to admit hay upon a floor at a lower end of said frame, a ramp supported at a rear end of

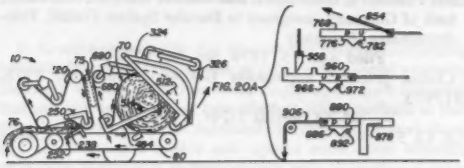
said frame and being pivotable between an upward vertical position and a horizontal rearwardly down position by means of hydraulic rams on said frame, said frame including a longitudinally extending channel along each side thereof, a plunger including a transverse member resting upon said channels, a plurality of vertical, parallel, double-pointed teeth carried by said transverse member, each tooth including a downward point at its lower end and an upward point at its upper end, a longitudinally mid portion of said teeth being connected to said transverse member, opposite ends of said transverse member being each pivotally connected by a link to a piston rod of a hydraulic cylinder contained within said channel.

4,022,003

CONTROLLING THE SIZE OF A ROLL CORE FORMED IN A CROP MATERIAL ROLL FORMING MACHINE

Wilson L. Strausser, Mohnton, and Aquila D. Mast, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Feb. 9, 1976, Ser. No. 656,663
Int. Cl.² A01D *39/00*
U.S. Cl. 56—341 **12 Claims**



1. In a method of forming crop material rolls by a mobile machine adapted to move across a field and having front and rear roll forming chambers, the combination of steps comprising:

moving the machine across the field;

delivering crop material to said machine;

forming a roll of crop material in said rear chamber;

discharging said roll from said rear chamber;

initiating formation of another roll in said front chamber prior to discharging of said roll from said rear chamber; and

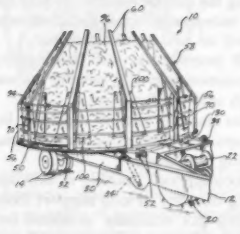
transfering said another roll being located in said front chamber from said front chamber to said rear chamber after discharging of said roll from said rear chamber and in response to said another roll having been formed to at least a preselected minimum diameter size in said front chamber.

4,022,004

HAY STACKING MACHINE

Donald L. Henke, Creston, Nebr., assignor to Creston Manufacturing Co., Inc., Creston, Nebr.

Filed Feb. 3, 1975, Ser. No. 546,385
Int. Cl.² A01D *87/12*
U.S. Cl. 56—346 **36 Claims**



1. A hay stacking machine, comprising:

a platform having a top surface for the building of a hay stack thereon, said platform having a depression;

support means for supporting said platform above a supply of hay;

transport means for picking said hay up from said supply and moving said hay to said platform surface over said depression;

a frame positioned around the periphery of said platform,

a plurality of radially compression arms vertically pivotally connected to said frame and adapted to move between downwardly and inwardly extending positions to upwardly and inwardly extending positions, and

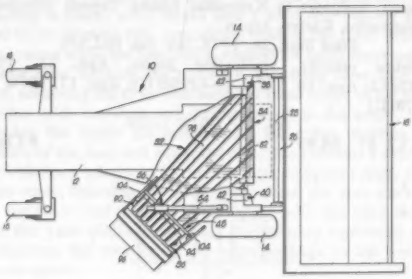
power means for yieldably maintaining pressure through said arms on hay on said platform and means for rotating said frame with said arms engaging said hay for moving hay into a layer and over said depression in said platform surface whereby said moving layer of hay sweeps up said hay moved to said platform surface and forms a stack from the bottom thereof with said compression arms pivoting upwardly as the stack increases in height.

4,022,005

DOUBLE WINDROWING METHOD AND APPARATUS

Cecil L. Case, Newton, Kans., assignor to Hesston Corporation, Hesston, Kans.

Division of Ser. No. 467,458, May 6, 1974, Pat. No. 3,928,955.
This application July 2, 1975, Ser. No. 592,415
Int. Cl.² A01D *79/00*
U.S. Cl. 56—372 **9 Claims**



1. In double windrowing apparatus:

a mobile chassis adapted for advancement across a field having a crop thereon;

means mounted on said chassis for raising a swath of the crop from the field as the chassis is advanced along a path of travel and projecting the raised crop rearwardly; and

structure on said chassis for receiving the projected crop and transferring the same obliquely of said path of travel and to one side of the same without discontinuing the rearward momentum of the crop whereby to deposit the crop in a windrow alongside said path of travel,

said structure being disposed within the lateral boundaries of said raising means.

4,022,006

TEXTILE YARN PROCESSING MACHINES

Frederick Hugh Howorth, Ollerton Hall, Withnall, Chorley, Lancaster, England

Continuation-in-part of Ser. No. 541,452, Jan. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 392,223, Aug. 28, 1973, abandoned. This application Dec. 17, 1975, Ser. No. 641,503
Claims priority, application United Kingdom, Sept. 12, 1972, 42214/72
Int. Cl.² D01H *11/00*
U.S. Cl. 57—34.5 **7 Claims**

1. In a machine having apparatus for processing textile

yarns continuously running at high speed, to permit threading up, doffing and the like without stopping the machine, said apparatus comprising means providing a main yarn conveying duct, means for introducing yarn into said duct comprising means providing a series of straight line unobstructed passages of predetermined length and materially smaller diameter than said duct spaced along the sides of and opening directly into the duct, the axes of all of said passages being inclined at the same acute angle with respect to the longitudinal axis of said duct in the direction of movement of said air column in said

duct, and yarn ends during threading up and broken ends being adapted to enter the outer ends of said passages, means for drawing air in through said passages at a predetermined high speed and for establishing a reduced speed column of yarn conveying air moving along the duct, the diameter and related effective length of each such passage being such as to provide a sufficiently high speed of air travel therethrough to move yarn rapidly therealong while imparting tension thereto until it enters said conveying duct, and said yarn after entering said duct being conveyed therealong in said air column.

4,022,007

COOLING MEANS FOR RINGLESS SPINNING FRAME

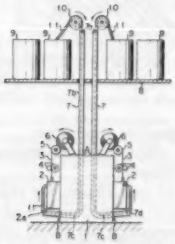
Kozo Motobayashi, Aichi, and Kazuo Kamiya, Nishio, both of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Mar. 28, 1975, Ser. No. 562,931

Claims priority, application Japan, Apr. 15, 1974, 49-42412; Apr. 16, 1974, 49-42950[U]; Apr. 17, 1974, 49-43278[U]

Int. Cl.² D01H *13/28*

U.S. Cl. 57—58.95 **8 Claims**



1. In a ringless spinning frame comprising a spinning frame body; a plurality of spinning units mounted on opposite sides of said spinning frame body; a plurality of sliver cans disposed above said spinning frame body; and a plurality of sliver guide conduits, one each disposed between each of said sliver cans and the respective corresponding said spinning unit, each said guide conduit extending downwardly into the interior of said spinning frame body and passing therethrough along the back and bottom of the said respective corresponding spinning unit and opening exteriorly of said spinning frame body at a position below the bottom of the said respective corresponding spinning unit; the improvement comprising: means, positioned closely adjacent each of said guide conduits within said spinning frame body, for preventing heat produced by said spinning units from being transferred to said guide conduits within said spinning frame body, said heat transfer preventing means comprising duct means disposed closely adjacent said guide conduits within said spinning frame body and extending therealong, a plurality of apertures connecting said duct means with said interior of said spinning frame body, said apertures being spaced along the length of said duct means, air inlet and outlet means respectively arranged on opposite end portions of said spinning frame body in fluid communication with said interior of said spinning frame body, for passing cold air present exterior of said body into said interior of said body through the inlet means, through said apertures into said means and outwardly through said outlet duct means, and for thereby withdrawing from said interior of said body the heat produced by said spinning units, fan means, positioned in at least one of said inlet and outlet means, for forcibly withdrawing said heat produced by said spinning units, separate duct means positioned on the top of said spinning frame body and extending therealong, a plurality of apertures connecting said separate duct means with said interior of said spinning frame body, and one of the air inlet and outlet means being connected to an end portion of said separate duct means spaced away from the other of said air inlet and outlet means.

4,022,008

CENTRIFUGAL SPINNING UNIT AND BEARING ARRANGEMENT FOR THE SAME

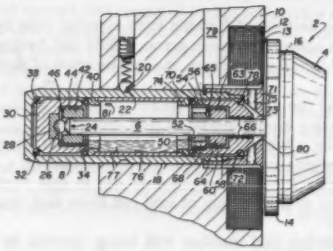
Klaus Pimiskern, Daisendorf, and Werner Herbert, Markdorf, both of Germany, assignors to Dornier System GmbH, Friedrichshafen, Germany

Filed Apr. 15, 1976, Ser. No. 677,325

Claims priority, application Germany, Apr. 23, 1975, 2517973

Int. Cl.² D01H *1/244*; F16C *1/24*

U.S. Cl. 57—100 **12 Claims**



1. A spinning unit comprising:

a. a support formed with an aperture and having a face about said aperture;

b. a bearing arrangement including:

1. a housing defining a cavity and formed with an opening communicating with said cavity;
2. an axial thrust bearing and a radial bearing in said cavity having a common axis passing through said opening,
3. a carrier member formed with an axial passage therethrough,
4. resilient mounting means radially interposed between said carrier member and said housing and sealingly securing the carrier member in said opening for limited radial movement, said radial bearing being fixedly mounted on said carrier member,
5. a shaft journaled in said bearings for rotation about said common axis and passing outward of said cavity through said passage, and
6. annular packing means mounted in said passage in fixed spatial relationship to said radial bearing and receiving said shaft;

c. means securing said housing in said aperture, said shaft projecting outward of said support from said aperture;

d. a spinning pot coaxially mounted on said shaft, said spinning pot having a bottom wall spacedly parallel to said face of said support; and

e. electrically operable drive means for rotating said shaft

and said pot about said axis, said drive means including a stator winding on said support and a plurality of permanent magnets mounted in said bottom wall, said stator winding and said magnets axially defining an air gap therebetween.

4,022,009

METALLIC CABLE

Leendert van Assendelft, Arnhem, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed May 3, 1976, Ser. No. 682,264

Claims priority, application Netherlands, May 12, 1975, 7505523; May 12, 1975, 7505524

Int. Cl.² D02G *3/12, 3/48*

U.S. Cl. 57—145 5 Claims

1. A reinforcing cable for elastomeric articles comprising helically formed filaments, one or more single metal wrapping filaments wound on two or more single metal core filaments that are not wound about one another, characterized in that the core filaments are of substantially identical helical shape and are positioned beside and against each other whereby each core filament is in line contact with at least one other core filament, the line of contact being parallel to the direction of the filament, and the wrapping filaments are in the form of a helix having the same hand and the same pitch as the core filaments and are positioned on the inside of the helix formed by the core filaments.

4,022,010

HIGH-STRENGTH ROPE

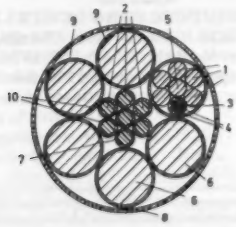
Jürgen Gladenbeck, Bonn-Rottgen, and Gerald Müller, Cologne, both of Germany, assignors to Felten & Guilleaume Carlswerk AG, Cologne, Germany

Filed Nov. 17, 1975, Ser. No. 632,359

Claims priority, application Germany, Nov. 22, 1974, 2455273

Int. Cl.² D02G *3/04*

U.S. Cl. 57—149 18 Claims



1. A high-strength rope, comprising at least one core component of elastic synthetic plastic material having a predetermined length; and a plurality of envelope components including filaments of high tensile strength aromatic polyamide, said filaments being of substantially equal lengths exceeding said predetermined length.

4,022,011

YARN PIECING METHOD FOR OPEN-END SPINNING MACHINE

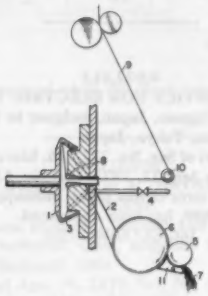
Hironori Hirai, 8-1, Kaidenhigashi-Tsukamoto, Nagaokakyo-shi, Kyoto, Japan

Filed Feb. 10, 1975, Ser. No. 548,728

Claims priority, application Japan, Feb. 14, 1974, 49-18360; Feb. 13, 1974, 49-18066[U]; Apr. 15, 1974, 49-42689[U]

Int. Cl.² D01H *15/00*

U.S. Cl. 57—156 3 Claims



1. A yarn piecing method for joining end yarn which is fibers supplied into a rotor by means of a feed roll with yarn drawn from a yarn package in an open-end spinning machine including a rotor, rotor brake and a feed roll feeding fiber sliver to an opening roll, comprising braking the rotor prior to yarn joining while the feed roll is rotated for some short period of time after braking the rotor for supplying fiber into the rotor, removing the fiber thus supplied from inside of the rotor together with the dust and dirt collected in the rotor, then releasing the brake for accelerating the rotor, starting the rotation of the feed roll when the rotor has reached a number of revolutions adequate for yarn joining to again supply fiber to the rotor, injecting the yarn drawn from the yarn package into the rotor and joining the end yarn with the yarn drawn from the yarn package, starting the take-up operation and accelerating the rotation of the yarn package to the normal take-up speed.

4,022,012

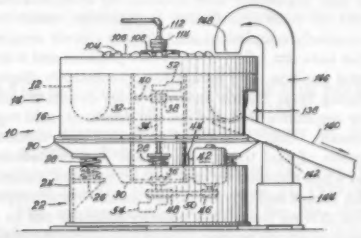
SURFACE FINISHING MACHINE

Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.

Filed Jan. 26, 1976, Ser. No. 651,400

Int. Cl.² B24B *31/06*

U.S. Cl. 51—163.2 39 Claims



1. Apparatus for treating the surface of parts or workpieces with loose finishing material while maintaining parts isolated from other parts and to prevent damage to parts as a result of collision therebetween, having a resiliently-supported, vibratory finishing chamber in which the workpieces are vibrated

with the finishing material, and in which the part-isolating means comprises transverse walls for separating the interior of the finishing chamber into individual compartments, which walls are adapted and arranged for movement along the finishing chamber and are supported for such movement and have edges thereof in close proximity to the walls of said finishing chamber, and further comprising means for relatively moving the edges of at least some of said transverse walls and portions of the interior walls of said finishing chamber into temporary closer proximity to each other, for better isolation of an individual compartment interior of said finishing chamber.

4,022,013

REGULATING DEVICE FOR ELECTRIC TIMEPIECES

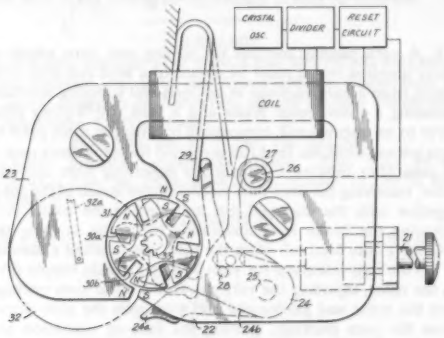
Noriyuki Kamijo, Nagano, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 232,326, March 2, 1972. This application Jan. 22, 1974, Ser. No. 435,567

The portion of the term of this patent subsequent to July 10, 1990, has been disclaimed.

Int. Cl.² G04C *3/00*

U.S. Cl. 58—23 R **11 Claims**



1. An electronic watch comprising electro-mechanical transducer means in the form of a step motor having an electrical driving portion and a mechanical driven portion; driving circuit means operatively coupled to said electrical driving portion of said transducer means for applying a pulse driving signal of alternating polarity thereto for incrementally advancing said mechanical driven portion; and regulating means including regulating cam means operatively coupled to said mechanical driven portion of said transducer means for displacement therewith regulating lever means displaceable between at least a first regulating position in interfering engagement with said regulating cam means and a second normal position out of such interfering engagement, reset switch means operatively coupled to said driving circuit means and displaceable between a first closed reset position and a second open normal position, and means for coordinately displacing said regulating lever means and said reset switch means between their respective first and second positions, said regulating cam means being positioned to orient said mechanical driven portion of said transducer means in a predetermined orientation when engaged by said regulating lever means, said reset switch means and driving circuit means being adapted to apply a first driving pulse of a polarity selected not to drive said mechanical driven portion of said transducer means when said mechanical driven portion is positioned in said predetermined orientation when said reset switch is displaced from its first to its second position so that said mechanical driven portion is first driven by the second pulse applied thereto after displacement of said reset switch means from its first to its second position.

4,022,014

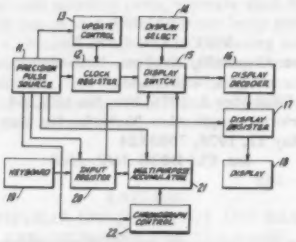
COMBINATION WRISTWATCH/CHRONOGRAPH/WRIST CALCULATOR/MEASURING DEVICE

John R. Lowdenslager, Stamford, Conn., assignor to Timex Corporation, Waterbury, Conn.

Filed Apr. 4, 1975, Ser. No. 508,595

Int. Cl.² G04B *47/00*; G04C *3/00*

U.S. Cl. 58—23 R **7 Claims**



1. In a wristwatch of the type having a high frequency source, a countdown dividing circuit connected thereto to provide a source of pulses including timing pulses, display decoder means adapted for receiving binary coded decimal data and converting it to display code, and display means connected to said display decoder, the improvement comprising:

a clock register connected to receive said timing pulses and comprising an information source,

a multipurpose accumulator comprising a counter connected to receive entry data from a selected one of a plurality of additional information sources other than the time of day,

wherein one of said additional information sources selectively supplied to said accumulator comprises a keyboard, an input register connected to said keyboard, means to increment or decrement a number stored in said multipurpose accumulator by the value of the number contained in said input register, and means to selectively connect the number in said input register to said display decoder,

means for controlling the admission of said entry data to said accumulator in one of a plurality of different ways according to the additional information source selected, and

means for selecting the output from either said clock register or from said multipurpose accumulator and supplying binary coded decimal data to said display decoder.

4,022,015

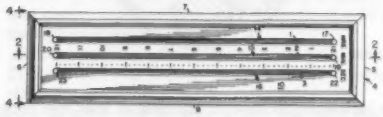
TIME INDICATING DEVICE

James R. Bailey, 4020 N. Pioneer Ave., Chicago, Ill. 60634

Division of Ser. No. 441,325, Feb. 11, 1974, Pat. No. 3,956,879. This application Apr. 2, 1976, Ser. No. 673,285

Int. Cl.² G04B *19/24*; G09D *3/10*; G04C *3/00*; G04B *19/02*

U.S. Cl. 58—6 A **19 Claims**



1. A time indicating device comprising an endless indicating belt which carries non-digital indicating means thereon that define four equally spaced segments of said belt, means comprising a face plate with an elongated opening therein

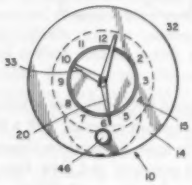
mounted adjacent said belt with said opening in superposed relationship to said non-digital indicating means so that from time to time said indicating means carried by said belt beneath said opening are visible through said opening as said belt is moved past said opening, said face plate carrying time period indicia on the top thereof adjacent said opening, the length of said opening substantially corresponding to the length of one of said segments and said non-digital indicating means being spaced apart a distance corresponding to the length of said opening so that when said belt is moved past said opening there will be a moment when one of said segments will appear over the entire length of said opening with two consecutive said non-digital indicating means appearing, one at each end of said opening, and means for moving said belt containing said non-digital indicating means past said opening.

4,022,016

GEAR DRIVE FOR AN INDICATING MECHANISM

Frans Brouwer, Glencoe, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.

Filed Feb. 5, 1976, Ser. No. 655,534
Int. Cl.² G04C *3/00*; G04B *19/02*; G01C *22/00*
U.S. Cl. 58—125 C **19 Claims**



1. A motor driven indicating assembly, comprising; housing means, motor means in said housing means, a motor shaft, an eccentric carried by said motor shaft, orbital gearing driven by said eccentric, said orbital gearing including a first gear and a second gear, a stationary ring gear, said first orbital gear engaging said stationary ring gear, an output ring gear, said second orbital gear engaging said output ring gear, indicator means driven by said output ring gear, the number of teeth on the stationary ring gear being different than the number of teeth of the first orbital gear, and the number of teeth on the output ring gear being different than the number of teeth on the second orbital gear.

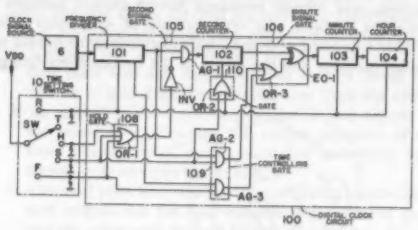
4,022,017

FULL ELECTRONIC CAR CLOCK WITH DIGITAL DISPLAY AND METHOD OF TIME SETTING THEREFOR

Motomu Aoki, 100-23 Nishikanenoi, Showa Kitakatsushika, Saitama, and Akira Ishikawa, 13-4, 3-chome, Kamirenjaku Mitaka, Tokyo, both of Japan

Continuation of Ser. No. 407,045, Oct. 17, 1973, abandoned. This application Aug. 14, 1975, Ser. No. 604,778
Claims priority, application Japan, Oct. 25, 1972, 47-106860; Feb. 22, 1973, 48-21605; Mar. 3, 1973, 48-25584; Mar. 20, 1973, 48-32129
Int. Cl.² G07C *5/04*; G04B *19/30*; G04C *3/00*; G04B *27/00*
U.S. Cl. 58—145 R **20 Claims**

1. A car clock with digital display comprising an electric storage battery of a car, an engine key switch electrically connected with the battery, a clock counter circuit connected with the battery, and a clock display electrically connected with the battery through the engine key switch, whereby when the engine key switch is changed to either start or run position, the clock display is energized to provide a digital display of time represented by the count in the clock counter while when the engine key switch is changed to a stop position, the clock



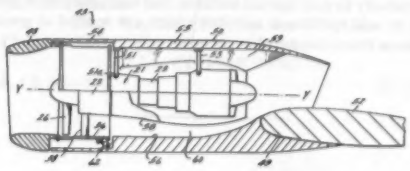
display is deenergized while the clock counter circuit continues to operate.

4,022,018

MOUNTING SYSTEM FOR A THRUST GENERATING ENGINE

Richard K. Tuten; Richard J. Barron, and Lawrence B. Venable, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Apr. 29, 1975, Ser. No. 572,647
Int. Cl.² F02C *7/20*; B64D *27/16*
U.S. Cl. 60—200 R **14 Claims**



1. In a system for mounting a thrust generating engine to an aircraft wherein the engine includes a casing for enclosing and supporting at least some of the thrust generating elements of the engine and said mounting system includes means connecting the casing to the aircraft for retaining said engine against rotational, axial, vertical and side movement relative to said aircraft, the improvement comprising:

force generating means operatively connected to said casing for generating a variable force for application to said casing for maintaining said engine in a predetermined position relative to said aircraft said force generating means generating said force in accordance with a signal which is dependent on a force other than the thrust reaction force exerted on said force generating means by said thrust generating engine, said signal being indicative of the level of thrust of said thrust generating engine.

4,022,019

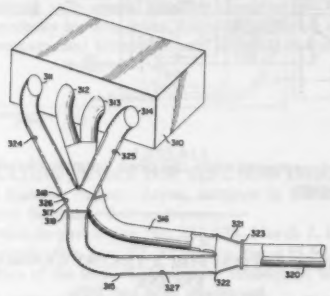
EXHAUST CONVEYING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Giampaolo Garcea, Milan, Italy, assignor to Alfa Romeo S.p.A., Milan, Italy

Continuation-in-part of Ser. Nos. 198,742, Nov. 15, 1971, abandoned, and Ser. No. 285,192, Aug. 31, 1972, abandoned. This application May 30, 1973, Ser. No. 365,151
Claims priority, application Italy, Nov. 20, 1970, 32012/70
Int. Cl.² F01N *7/10*
U.S. Cl. 60—282 **2 Claims**

1. An exhaust conveying system for internal combustion engines, having an engine head, a single exhaust manifold and a plurality of discrete exhaust pipes connecting the engine head to the single exhaust manifold, each of said exhaust pipe

comprising at least a pair of tubular members, one member within the other member, including an outer smooth tubular member and an inner circumferentailly corrugated tubular member, said tubular members having curved sections and rectilinear sections, the corrugations of said inner tubular member extending over the whole circumference of said inner tubular member and the crests of the corrugations being adherent to the surface of the outer tubular member so as to define substantially closed air spaces between said tubular members, with the gaseous fluid contained in said spaces being stationary so as to reduce convection losses, the inner tubular member having corrugations which are closely spaced in proximity to said curved sections and corrugations in proximity to said rectilinear sections which are spaced at greater distances from one another.

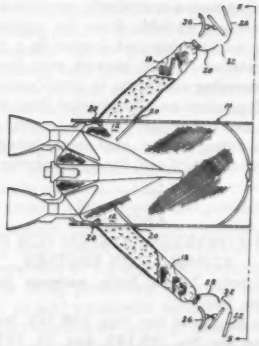


4,022,020

DEBRIS CATCHER FOR THRUST TERMINATION PORTS

Jack D. Elias, Torrance, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 5, 1975, Ser. No. 638,210
Int. Cl.² F02K *9/04*
U.S. Cl. 60—263 **6 Claims**



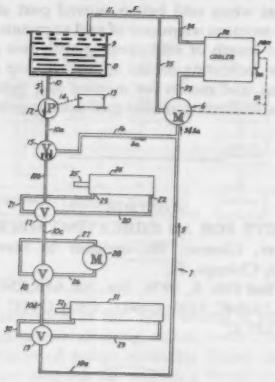
1. In combination with a reaction motor having at least one exhaust port, a debris catcher comprised of: a porous container with first and second openings opposite each other, means attached to the edge of the first opening for securing the edge of the opening to the reaction motor outside and encircling the exhaust port, and a means attached to the edge of the second opening for closing the second opening.

4,022,021

CONSTANT SPEED HYDRAULIC MOTOR

Wayne B. Russell, Jr., 3895 Lugo Ave., Lynwood, Calif. 90262

Filed Feb. 7, 1975, Ser. No. 547,809
Int. Cl.² F15B *11/16, 21/04*
U.S. Cl. 60—420 **5 Claims**



1. A constant speed hydraulic motor adapted for incorporation in a hydraulic system in series with a hydraulic pump and a variable hydraulic load, the load variations of which produce variations of fluid pressure and flow rate at the motor, said motor comprising a housing containing:

a. a fluid inlet port;
b. a fluid exit port;
c. a fluid driven rotor;
d. a fluid inlet passageway from the inlet port to the rotor;
e. a fluid exit passageway from the rotor to the exit port;
f. a by-pass duct adapted to provide fluid communication between the fluid inlet passageway and the fluid exit passageway, by-passing the rotor;
g. a cylinder in communication with the inlet port;
h. a piston in said cylinder movable in a path of travel which enables it to meter fluid flow into said duct, said piston being urged by fluid pressure at the inlet port to move toward a position where it does not greatly impede fluid flow into said duct; and
i. means urging said piston to move toward a position where it substantially blocks the fluid flow into said duct;

said motor including a cavity within which the rotor is contained,

said fluid inlet passageway being located beneath said cavity and having a curved portion conforming substantially with the peripheral portion of the rotor,

and nozzle means from said curved portion of the inlet passageway to the rotor cavity for injecting fluid to the rotor,

said fluid exit passageway being located above said cavity and having a curved portion conforming substantially with the peripheral portion of the rotor,

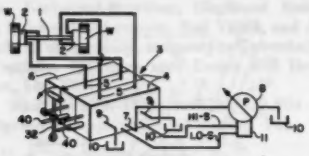
and passages from said cavity to said curved portion of the passageway for fluid flow from the cavity;

whereby when the fluid pressure and flow rate at the inlet port increases, the flow rate through said duct increases, and when the fluid pressure and flow rate at the inlet port decreases, the fluid flow rate through said duct decreases, thus maintaining the flow to the rotor and speed of the rotor substantially constant.

4,022,022
HYDRAULIC SYSTEM AND CONTROL VALVE ASSEMBLY THEREFOR

Walter Edwin Marietta, Mentor, Ohio, assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Apr. 26, 1976, Ser. No. 680,534
Int. Cl.² F16H *39/46*; F15B *11/16*
U.S. Cl. 60—433 **15 Claims**

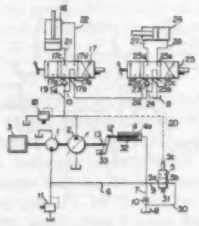


1. A hydraulic system comprising variable volume pump means, a directional control valve, and a fluid motor operatively interconnected whereby fluid delivered by said pump means is conducted to said fluid motor via said directional control valve; said directional control valve having variable area orifice means to determine the speed of actuation of said fluid motor; said pump means having output adjustment means responding to the pressure drop across said orifice means to adjust the output of said pump means according to the flow demand set by said orifice means; a pressure compensating member upstream of said orifice means having opposite ends exposed respectively to the pressures upstream and downstream of said orifice means; spring means biasing said compensating member in the same direction as the downstream pressure acting on one end; said compensating member, upon increase of upstream pressure with respect to downstream pressure, being moved thereby in the opposite direction against said spring means to provide an additional restriction in the supply path of fluid to said directional control valve upstream of said orifice means thus to maintain the flow demand set by said orifice means.

4,022,023
HYDRAULIC CIRCUIT FOR CONTROLLING ACTUATORS IN A CONSTRUCTION VEHICLE

Nobuaki Inaba, Hiratsuka, and Kenzo Hoashi, Yokohama, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 5, 1975, Ser. No. 638,070
Claims priority, application Japan, Aug. 27, 1974, 49-101806
Int. Cl.² F16H *39/46*
U.S. Cl. 60—445 **1 Claim**

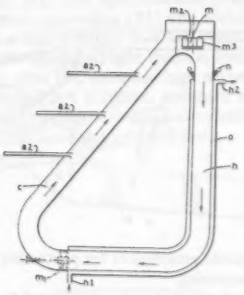


1. In a hydraulic circuit system for controlling actuators in a construction vehicle which includes:
a prime mover;
a fixed displacement pump driven by said prime mover;
a variable displacement pump driven by said prime mover and connected at the outlet side thereof to the actuators through their respective directional control valves;
a controlling cylinder means hydraulically connected through a first pilot line to an outlet of said fixed displacement pump and mechanically connected to a swash plate of said variable displacement pump for controlling volumetric output of said variable displacement pump; and
a drain line with an orifice connected between said first pilot line and a tank for draining hydraulic fluid from said fixed displacement pump, the improvement comprising:
a. a bypass line, one end thereof being connected to said first pilot line and the other end thereof being connected to said drain line downstream from the orifice;
b. an unloading valve means provided in said bypass line for selectively unloading the output pressure of said fixed displacement pump when the unloading valve means is in an open state; and
c. a second pilot line, one end thereof being connected to said output line for said variable displacement pump and the other end thereof being connected to an actuating means of said unloading valve means for selectively operating the actuating means of said unloading valve means in response to the variation of the output pressure of said variable displacement pump,
whereby said prime mover is prevented from stalling upon an overloading condition of said actuators and whereby power loss of both pumps is significantly minimized when said directional control valves are respectively in neutral positions so that the actuators are not actuated.

4,022,024
THERMOSIPHON ENGINE AND METHOD

Eugenio Eibenschutz Abeles, Fresas No. 102-602, Mexico City 12, D.F., Mexico

Filed May 13, 1975, Ser. No. 577,028
Claims priority, application Mexico, May 14, 1974, 151209
Int. Cl.² F01K *25/02*
U.S. Cl. 60—641 **13 Claims**



1. A thermosiphon engine comprising channel means defining a closed path for liquid flow and including a pair of upstanding columns, said columns including a first column in which liquid flows upwardly and a second column in which liquid flows downwardly, a liquid actuated rotary member in said path having a shaft from which power can be taken as liquid flows in said path and actuates said member, said first column comprising first means to absorb heat and said second column comprising second means to reflect or radiate heat.

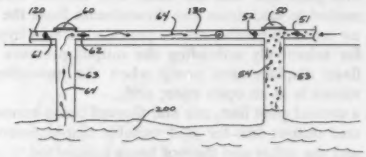
4,022,025
CYCLICAL ENERGY TRANSFER METHOD AND APPARATUS

Clarence Kirk Greene, 100 N. Arlington Ave., Reno, Nev. 89501

Filed Nov. 25, 1974, Ser. No. 526,855
Int. Cl.² F03G *7/00*
U.S. Cl. 60—641 **5 Claims**

1. The method of enhancing the flow of hot acquifer from a geothermal energy source and through energy extracting

means and return to a position beneath the surface of the earth including: 1. Providing a plurality of wells interconnecting from the surface of the earth to a location beneath the surface of the earth wherein at least one, of which wells intersects a subsurface hot acquifer; 2. Causing hot acquifier to flow from said source of hot acquifer intersected by said well, through said well to energy extracting means located adjacent



to the surface of the earth; 3. Causing said hot acquifer to pass through said energy extracting means deminishing its temperature in so doing; 4. Removing effluent from said energy extracting means and passing it to a subsurface area through at least one other well of said plurality of wells, simultaneously introducing into said effluent a fluid of a lower temperature than the effluent in order to reduce pressure in the effluent and return line.

4,022,026

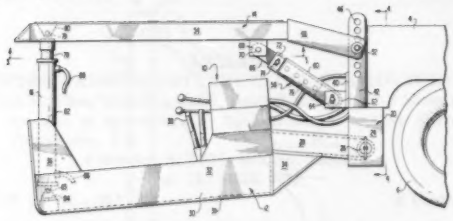
SAFETY SHIELD ATTACHMENT

Ray Childress, P.O. Box 853, Richlands, Va. 24641

Filed June 10, 1976, Ser. No. 694,714

Int. Cl.² E21D *19/00*

U.S. Cl. 61—63 **7 Claims**



1. A safety sheild attachment for protecting the operator of a machine, comprising

a rigid support adapted to be connected to said machine,

a platform connected by a first horizontal pivot at an inner end thereof to said support and having a free end extending outwardly therefrom,

said platform being adapted to support a machine operator,

a control station on said platform disposed inwardly from the free end thereof, said platform providing a support for a machine operator inwardly from the free end thereof,

a canopy spaced above said platform,

a second horizontal pivot connecting spaced above the first horizontal pivot and connecting an inner end of said canopy and said support,

said canopy having an outer end overlying the outer end of said platform,

said canopy being swingable upwardly and downwardly about said second horizontal pivot,

hydraulic jack means connected between the free ends of said platform and said canopy,

controlled means for serving said hydraulic jack means with pressure and return fluid and adjustable means connected between said canopy and said rigid support for selectively limiting the downward swinging of said canopy about said second horizontal pivot.

4,022,027

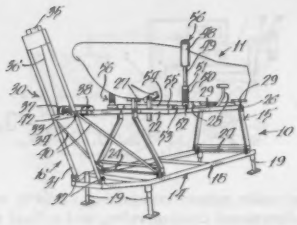
MARINE STRUCTURES

Siegfried K. Tetzner, 5307 W. Lake Shore Drive, Wonder Lake, Ill. 60097

Filed June 16, 1975, Ser. No. 587,163

Int. Cl.² B63C *1/00*

U.S. Cl. 61—65 **14 Claims**



1. In a marine installation in a body of water having an upper surface, a bottom, and an upper freeze zone extending downwardly from said upper surface up to a predetermined maximum depth, a boat station comprising: a lift frame for supporting a boat; a base frame having legs adapted to be seated on said bottom and having an upper portion disposed at least said depth below said upper surface of the water when the legs are seated on said bottom; means for selectively disposing said lift frame on said base frame in (a) a submerged, boat docking position, (b) a raised boat storage position wherein a boat supported therein is raised above said water upper surface, and (c) a winter storage position below said freeze of the water; a winch frame; and means for movably mounting the winch frame to said base frame for selective disposition in (d) a winching position wherein said winch frame may removably carry a winch above said water upper surface, and (e) a water storage position at least said freeze zone depth below said water upper surface, whereby shifting of ice in said freeze zone is effectively precluded from shifting said boat station in the winter storage position.

4,022,028

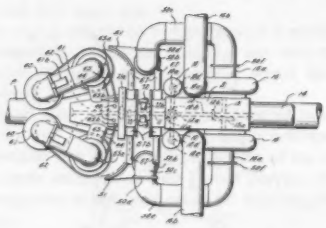
SUBMARINE PIPE TRENCHING APPARATUS

Charles F. Martin, 4814 Lotus St., Houston, Tex. 77045

Filed Dec. 23, 1971, Ser. No. 211,386

Int. Cl.² E02F *5/08*

U.S. Cl. 61—72.4 **38 Claims**



1. Submarine pipeline trenching apparatus, comprising:

a trench cutter assembly;

a support body adapted to extend longitudinally above a pipeline;

pipe crawler means connected to said body and engageable with the pipeline for imparting longitudinal movement to said body and said cutter assembly; and

cutter positioning means operably connected with said cutter assembly for moving said cutter assembly from a raised substantially horizontal position substantially

alongside the pipeline to an upright position below the pipeline after said crawler means is positioned on the pipeline.

4,022,029

USEFUL IMPROVEMENTS IN APPARATUS FOR, AND IN METHODS OF, CONSTRUCTING A TUNNEL

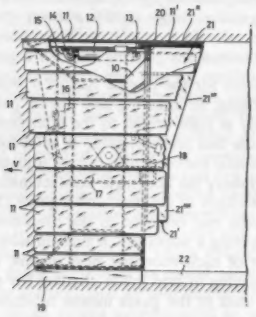
Hans Jütte, Dortmund-Brechten; Siegmund Babendererde, Munich; Reinhard Bokemeyer, Bad Vilbel, and Adolf Foik, Offenbach, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen and Hochtief AG, Frankfurt, both of, Germany

Filed Dec. 10, 1975, Ser. No. 639,504

Claims priority, application Germany, Feb. 27, 1975, 2508407

Int. Cl.² E01G *3/00*

U.S. Cl. 61—85 **27 Claims**



1. An apparatus for constructing an underground tunnel, said apparatus comprising a drive shield composed of a plurality of elongate members arranged side-by-side in parallel configuration and generally around the axis of the tunnel, a frame for supporting and guiding the members for longitudinal displacement, means for causing relative displacement between the frame and the members to effect driving and advancement of the tunnel, a movable rear shield for supporting the tunnel wall rearwardly of the frame relative to the direction of tunnel driving, and means for supporting the tunnel wall exposed behind the rear shield as the latter is moved up to follow the driving progress, said supporting means including a plurality of individual pre-formed lining elements positioned in the rear shield before the latter is moved up, said rear shield being discontinuous circumferentially of the tunnel to permit a floor lining to be produced directly on the floor of the tunnel to act as a support for said lining elements.

4,022,030

THERMAL CYCLE FOR THE COMPRESSION OF A FLUID BY THE EXPANSION OF ANOTHER FLUID

Jean Renaud Brugerolle, Paris, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Jan. 27, 1972, Ser. No. 221,294

Claims priority, application France, Feb. 1, 1971, 71.03262

Int. Cl.² F25J *3/02*

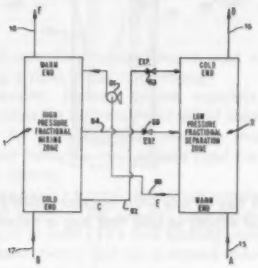
U.S. Cl. 62—30 **26 Claims**

1. A method for compressing a less volatile fluid under a low pressure (15) with a more volatile fluid under a high pressure (17), which comprises:

a. in a fractional separation zone (2) under at least one low pressure, putting into counter-flow liquid vapor separation equilibrium at least the less volatile fluid (15) available in said fractional separation zone with at least one light fraction (52) at most as volatile as said more volatile fluid under a high pressure (17), thereby to obtain a more volatile fluid (16) under substantially said low pressure and at least one heavy fraction (50) at least as volatile as said less volatile fluid under a low pressure (15), said more volatile fluid under said low pressure being obtained substantially colder than said at least one heavy fraction,

b. extracting (50) said heavy fraction from said fractional separation zone (2), compressing (51) said withdrawn heavy fraction from a low pressure to a high pressure, introducing said compressed heavy fraction into a fractional mixture zone (1),

c. in said fractional mixture zone (1) under at least one high pressure, putting into counter-flow liquid-vapor mixture equilibrium at least the more volatile fluid (17) available



in said fractional mixture zone with at least said heavy fraction (50), thereby to obtain a less volatile fluid (18) under substantially said high pressure and at least said light fraction (52), said less volatile fluid under said high pressure being obtained substantially warmer than said at least one light fraction,

d. extracting (52) said light fraction from said fractional mixture zone, expanding (53) said withdrawn light fraction from a high pressure to a low pressure, and reintroducing said expanded light fraction into said fractional separation zone (2), each said high pressure being higher than each said low pressure, and each said less volatile fluid and heavy fraction being less volatile than each said more volatile fluid and light fraction.

4,022,031

METHOD FOR PRODUCING FROZEN CONFECTION

Thomas F. Calim, P.O. Box 158, Jackson Center, Ohio 45334

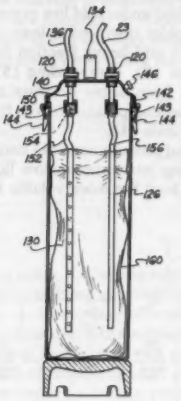
Continuation of Ser. No. 356,387, May 2, 1973, abandoned. This application July 24, 1975, Ser. No. 598,809

Int. Cl.² G01F *11/00;* **A23G** *9/00*

U.S. Cl. 62—66 **2 Claims**

1. The steps in the method of dispensing soft ice cream or the like, said method comprising, positioning a refrigerated sanitized flexible bag of mix in a rigid tank means, said tank means including walls for confining said flexible bag thereby preventing rupture thereof during subsequent pressurization; delivering pressurized gas through an inlet having at least one opening communicating with said bag to pressurize the mix therein; releasing said pressurized mix from said bag to the inlet of a heat exchanger means to chill the mix and thereby

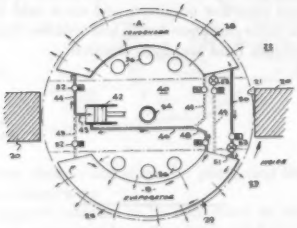
stiffen its state; sequentially releasing portions of said chilled mix from said heat exchanger means; and replacing said flexible sanitized bag of mix with another filled flexible sanitized bag when the supply in said first bag is exhausted.



4,022,032
REFRIGERATION SYSTEM

Clinton W. Nott, R.D. 1, Box 416, Dallastown, Pa. 17313

Filed Dec. 16, 1975, Ser. No. 641,270
Int. Cl.² F25B 3/00, 13/00
U.S. Cl. 62—499 2 Claims

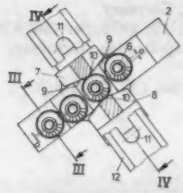


1. In refrigeration, air conditioning systems and the like, a wall having an opening therein, said wall having on opposite sides thereof an outside area and an inside area, a support surface, a rotary unit above said support surface and said rotary unit including a housing movably mounted in the opening in said wall, seal flaps contiguous to said unit, said housing including a pair of similar heat exchangers that selectively provide and define a condenser and an evaporator, said housing having a flat bottom wall spaced from said support surface, and said bottom wall including spaced apart air inlets that are arranged at the lower portion of said heat exchangers, said housing further including a curved side wall that has diammetrically opposed air outlets therein, a cover detachably mounted on said housing, each of said heat exchangers including coils and headers and motor operated fans, said housing including an intermediate section defined by spaced parallel wall portions, a compressor mounted in said intermediate section, conduits operatively connecting said compressor and heat exchangers together, solenoid valves and expansion valves operatively connected to said conduits, and means for oscillating and moving said unit.

4,022,033
SHIFT DEVICE FOR THE NEEDLE BED OF A STRAIGHT KNITTING MACHINE

Hans Schieber, and Erich Krause, both of Bopfingen, Germany, assignors to Universal Maschinenfabrik Dr. Rudolf Schieber KG, Westhausen, Germany

Filed Mar. 19, 1976, Ser. No. 668,383
Claims priority, application Germany, Mar. 26, 1975, 2513442
Int. Cl.² D04B 7/00, 7/20
U.S. Cl. 66—69 8 Claims

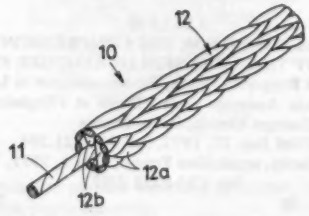


1. A shift device for the needle bed of a straight knitting machine comprising; an indexing disc having periphery movable substantially at right angles to the intended direction of shift of the needle bed and stoppable in selected positions; a plurality of eccentric indexing boss means adjustably mounted on the disc periphery for eccentric displacement about spindles extending radially of the disc; and a guide channel securable to the needle bed oriented in the direction of the disc periphery and having a width which substantially corresponds to the diameter of each eccentric boss means, the eccentric boss means engaging in said guide channel for establishing a predetermined shift of the guide means substantially at right angles to the direction of the peripheral movement of the disc in accordance with the eccentricity of the boss means.

4,022,034
REINFORCEMENT FOR A TAPE EDGE OF A SLIDE FASTENER

Yoshio Matsuda, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Oct. 14, 1975, Ser. No. 621,836
Claims priority, application Japan, Oct. 21, 1974, 49-126945
Int. Cl.² D04B 1/00; A44B 19/34
U.S. Cl. 66—169 R 2 Claims



1. A tape edge reinforcement for a slide fastener which comprises an elongate core member and a tubular knitted fabric member disposed in circumferentially surrounding relation to said core member and extending longitudinally therewith, said tubular member consisting of a warp-knitted structure having needle loops and sinker loops interconnected therewith and urging said sinker loops into fastening engagement with said core member.

4,022,035

PANTY HOSE WAIST OPENING

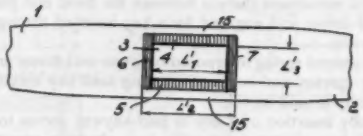
Francesco Lonati, Via Valsorda, 28, Brescia, Italy

Continuation-in-part of Ser. No. 305,632, Nov. 10, 1972, Pat. No. 3,924,423. This application Sept. 6, 1974, Ser. No. 503,838

Claims priority, application Italy, Sept. 10, 1973, 5178/73

Int. Cl.[2] D04B 9/42; A41B 9/14

U.S. Cl. 66—177 2 Claims



1. A method for manufacturing seamless panty hose having a tubular panty portion with a waist opening and two legs integral with said panty portion on a circular hosiery knitting machine having a needle cylinder, the method including the steps of knitting a first of said legs by continuously rotating said needle cylinder and forming complete courses, knitting a panty portion adjacent said waist opening by reciprocating said needle cylinder, inactivating a number of adjacent needles at the end of each of a number of consecutive strokes of reciprocation to form partial courses and controlling the needles adjacent said number of inactivated needles to form at said end of each of said strokes of reciprocation a corresponding one of two transversally spaced apart knit selvage edges, thereby defining a waist opening which extends transversally to the tubular panty portion by an extent substantially corresponding to the arc occupied by said inactivated needles and longitudinally by an extent proportioned to said transverse extension, activating said inactivate number of adjacent needles and knitting a second of said legs by continuously rotating said needle cylinder and forming complete courses.

4,022,036

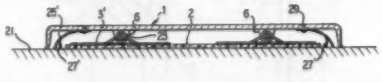
TAMPERPROOF SECURITY DEVICE FOR EQUIPMENT AND METHOD OF PROTECTION

Stanley W. Cebuhar, 3130 E. 67th St., Tulsa, Okla. 74105

Filed Dec. 19, 1975, Ser. No. 642,600

Int. Cl.[2] F16B 41/00; E05B 73/00

U.S. Cl. 70—58 12 Claims



1. A security device for equipment protection comprising in combination,

an anchor pad means for adhesive attachment to a table top or the like;

an enclosing cover for the anchor pad means having a periphery greater than the periphery of the anchor pad means along the table top to leave a space between said peripheries along the full extent thereof;

locking means, including a portion of said anchor pad means and a portion of said cover for locking the cover to the anchor pad means;

attachment means penetrating the cover for securing the equipment thereto; and,

additional security means attached to the device within the cover in tension engagement with the table top to preclude breaking of said adhesive attachment.

4,022,037

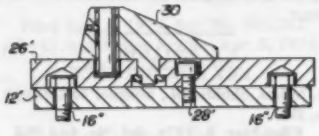
SHIELD LOCK ASSEMBLY

Russell W. Walters, Richmond, Ky., assignor to BMR Security Products Corporation, Richmond, Ky.

Filed Aug. 21, 1975, Ser. No. 606,721

Int. Cl.[2] F16B 41/00

U.S. Cl. 70—232 11 Claims



1. A shield lock assembly for shielding at least one securing member engaging a rigid frame comprising:

a. a shield member, fastener means separate from said securing member for fastening said shield member to said rigid frame for shielding said securing member, said shield member being secured to said rigid frame only by said fastener means,

b. a lock housing having a concealed pivot member received in said shield member for rotative displacement of said lock housing to at least (1) a first locking position covering said fastener means and (2) a second unlocking position for exposing said fastener means,

c. said pivot member extending into said shield member in a direction toward said rigid frame and being concealed by said lock housing,

d. said lock housing having at least one side member extending therefrom adapted for releasable engagement with a side surface of said shield member when said lock housing is in said first locking position, and

e. lock means cooperating with said lock housing to lock said lock housing in said first locking position.

4,022,038

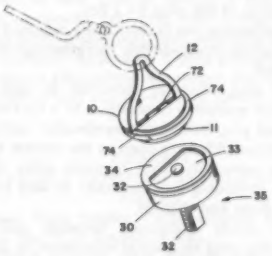
MAGNETICALLY OPERATED LOCKING DEVICE AND KEY

Albert J. Miller, Santa Clara, Calif., assignor to Engineering Systems Corporation, Santa Clara, Calif.

Filed Feb. 20, 1976, Ser. No. 659,843

Int. Cl.[2] E05B 47/00

U.S. Cl. 70—276 1 Claim



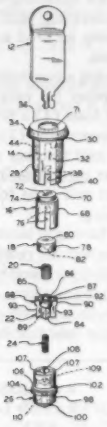
1. A lock assembly, comprising a generally cylindrical lock body, a lock shaft extending through said lock body coaxially in freely rotating fashion and extending beyond one face of said body, a plurality of fixed magnets disposed within said body and oriented parallel to the axis thereof, a plurality of holes disposed in said body and opening to the other face of said body, each of said holes aligned with one of said fixed magnets, the outer portion of each of said holes including a sleeve extending flush with said outer face, a plurality of movable magnets, each translatably disposed within one of said holes and operatively associated with the respectively

aligned fixed magnet, each of said movable magnets including a jacket thereabout, each jacket including a flange extending from the inner end thereof and adapted to engage the inner end of said sleeve of the respective hole to limit extension of said magnet from said hole, a disc-like rotor secured to said shaft adjacent to said other face of said body, detent means on said rotor for engaging at least one of said movable magnets as it extends from its associated hole, and key means for disengaging said movable magnets and said detent means and rotating said rotor.

4,022,039
KEY EJECTOR LOCK

Aloysius J. Mikos, Skokie, Ill., assignor to Chicago Lock Co., Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 664,904
The portion of the term of this patent subsequent to July 27, 1993, has been disclaimed.
Int. Cl.² E05B *17/00, 27/08*
U.S. Cl. 70—388 **11 Claims**

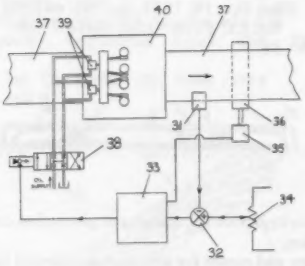


1. A key ejector lock which comprises:
a tubular barrel having an internal shouldered portion defining rearwardly opening circumferentially spaced notches,
a tubular front end plug rotatably mounted in said barrel and having a front end wall, a cylindrical tubular side wall, and a keyway extending through the front end wall for operation of the plug by a key,
said side wall having two diametrically opposed engagement slots extending longitudinally therethrough from the rear end thereof,
a rear end plug rotatably mounted in said barrel and adapted for operative connection to a locking member,
said rear end plug having a non-circular central slideway and two outer slideways open to the central slideway and extending outwardly from opposite sides thereof, said slideways extending longitudinally in said rear end plug from the front end thereof,
a rotatable driver interposed between said plugs and mounted for axial reciprocal movement in said barrel,
said driver having a head and a non-circular elongated body extending rearwardly from the head,
said driver also having two lugs extending outwardly from opposite side of said head and integral therewith, and two wings extending outwardly from opposite sides of said body longitudinally therealong and integral therewith and with said lugs,
said lugs and said wings being received in respective said engagement slots to provide a sliding drive connection between said front end plug and said driver,
said driver body and said wings being received in said central and outer slideways, respectively, to provide a sliding drive connection between said driver and said rear end plug,
said lugs being removably received in respective ones of said notches for securing said rear end plug in respective locked and unlocked rotational positions,
a first spring interposed between said rear end plug and said driver and resiliently urging said driver and thereby said lugs forwardly in said barrel towards said shouldered portion,
a key ejector received in said front end plug for axial reciprocal movement therein between the front end plug and said driver and engaged by a key inserted through said keyway,
and a second spring interposed between said driver and said key ejector and resiliently urging said key ejector forwardly in said barrel,
whereby insertion of a key in said keyway serves to move said key ejector rearwardly into abutting engagement with said driver, to thereby move said lugs rearwardly of said notches and free the rotatable parts for rotation and enable the key to rotate said front end plug for rotating said rear end plug between said locked and unlocked positions thereof, and said key ejector acts to eject the key when released in any rotational position thereof.

4,022,040
METHOD OF OPERATION AND CONTROL OF CROWN ADJUSTMENT SYSTEM DRIVES ON CLUSTER MILLS

John W. Turley, Oxford, Conn., assignor to T. Sendzimir, Inc., Waterbury, Conn.

Filed Sept. 25, 1975, Ser. No. 616,582
Int. Cl.² B21B *31/26, 37/00*
U.S. Cl. 72—10 **5 Claims**



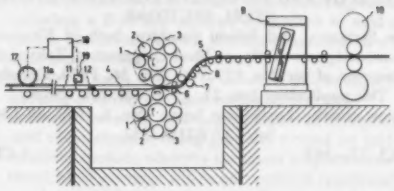
1. In a cluster mill having individual drives on at least one of the backing shafts, to adjust the roll gap in line with each saddle, means for mechanically synchronizing the drives such that they act together to form a roll gap which tapers down from front to back of the mill when operated in one direction, and which tapers down from back to front when operated in the other direction, the magnitude of the taper being proportional to the synchronized movement of the drives away from their neutral position of which the roll gap is parallel, together with mechanical means to allow individual adjustment of the roll gap in line with each saddle, independently of the synchronzied adjustment.

4,022,041

METHOD OF ROLLING INGOTS INTO METAL STRIPS

Wilhelm Friedrich Lauener, Langenhard, Switzerland, assignor to Rollcast S.A., Zug, Switzerland

Filed May 19, 1976, Ser. No. 687,934
Claims priority, application Switzerland, May 21, 1975, 6529/75
Int. Cl.² B21B *37/00, 39/00*
U.S. Cl. 72—15 7 Claims



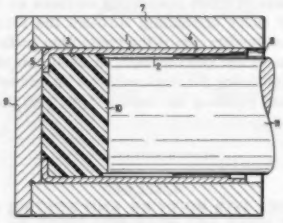
1. A method of rolling ingots into metal strip by means of a major deformation machine having two working roller systems with parallel axes, comprising the steps of forcing each ingot into said machine by means of a conveyor mechanism, stopping said conveyor mechanism as the trailing end of the ingot nears the said machine and reducing the spacing between the axes of the roller systems in order to roll the part of the work in the roller contact section of said machine until separation takes place, and drawing the so-separated rear end section of the ingot back out of the major deformation machine.

4,022,042

METHOD OF PRODUCING A THIN SHELL FOR OVERRUNNING ROLLER CLUTCHES

Leo Linz, and Georg Schaeffler, both of Herzogenaurach, Germany, assignors to Industriewerk Schaeffler OHG, Herzogenaurach, Germany

Filed July 15, 1975, Ser. No. 596,070
Claims priority, application Germany, Aug. 3, 1974, 2437488; Nov. 15, 1974, 2454228
Int. Cl.² B21D *31/04, 41/02*
U.S. Cl. 72—62 3 Claims



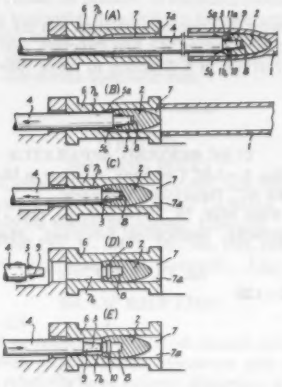
1. A method for producing a thin-walled outer shell for an overrunning roller clutch provided with central profiled camming surfaces for cam rollers with an outer envelope circle and an inner envelope circle and smooth roller races at either end comprising drawing a thin-walled shell whose bore is profiled in the central region to form the camming surfaces for the cam rollers and overrunning clutch and which is designed in an adjacent region as a smooth cylindrical race for the rollers with a diameter which is equal to or greater than the diameter of the outer envelope circle of the camming surfaces, while the region on the other side of the camming surfaces has with the same wall thickness an inside diameter which is equal to or smaller than the diameter of the inner envelope circle of the camming surfaces, and subsequently inserting the shell into a bore of a matrix and widening by the application of internal pressure in the last mentioned race area until it bears against the matrix bore.

4,022,043

PLUG CHANGING MECHANISM FOR USE IN PIERCING MILLS

Michel Chevet, Montbard, France, assignor to Valti Societe Anonyme pour la Fabrication de Tubes Roulements, Paris, France

Filed Apr. 4, 1975, Ser. No. 565,262
Claims priority, application France, Apr. 5, 1974, 74.12188
Int. Cl.² B21B *25/02*
U.S. Cl. 72—97 5 Claims



1. In a tube forming machine comprising a mandrel which carries at one end a detachable plug which is driven into the work, means for axially reciprocating said mandrel between a work-engaging position and a retracted position remote from said work, plug-gripping means for attaching said plug to and separating said plug from said mandrel, means for actuating said plug-gripping means, the improvement according to which said actuating means is positioned along the path of travel of said mandrel and between said work-engaging and retracted positions,

and said actuating means comprises a cylindrical member coaxial with said mandrel having a passage therein through which said mandrel extends when in work-engaging position, said passage having a first section large enough to receive said plug, and a second section too small to receive said plug, and said plug-gripping means being normally located in a plug-gripping position, but urged into a plug-releasing position by contact with the inner wall of said second passage section.

4,022,044

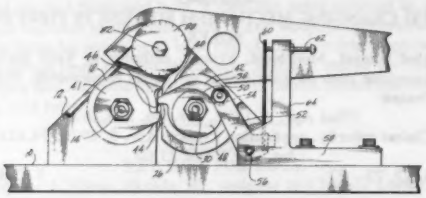
MACHINES FOR CENTERLESS COLD ROLLING OF GEARS

Oleg Szymber, Palos Verdes, Calif., assignor to Southwestern Industries, Inc., Los Angeles, Calif.

Filed June 18, 1976, Ser. No. 697,382
Int. Cl.² B21H *5/02*
U.S. Cl. 72—108 10 Claims

1. A centerless gear forming tool for cold rolling teeth on a gear blank, comprising a frame, a first rotating member including a gear forming roll journaled on the frame for rotation about an axis, a carriage movable with respect to the frame in a direction transverse to the axis of the first rotating member, a second rotating member including a gear forming roll journaled on the carriage opposite the other roll for rotation about an axis parallel to the axis of the first member, drive means for rotating the first and second members in the same direction

relative to each other at synchronized angular rates, lug means projecting from the periphery of both of the rolls and movable with the rolls, the lug means having work clamping surfaces extending radially outwardly from the respective rolls, the



surfaces moving into opposing relation wih the rotation of the rolls by said drive means in a first direction, and spring means urging the carriage in a direction to move rolls toward each other.

4,022,045

TUBE BENDING APPARATUS

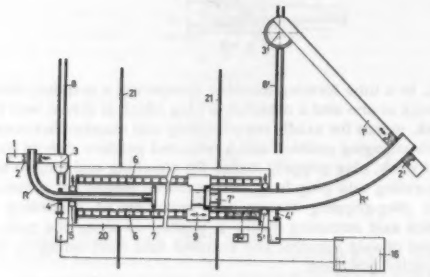
Manfred Riha, Krefeld, Germany, assignor to Mannesmannrohen-Werke AG, Dusseldorf, Germany

Filed Mar. 18, 1976, Ser. No. 668,111

Claims priority, application Germany, Mar. 24, 1975, 2513561

Int. Cl.² B21D 7/16

U.S. Cl. 72—128 **6 Claims**



1. In apparatus for bending tubes having inner and outer ends, having a bed, a feed carriage guidably mounted on the bed for rectilinear movements, power means to reciprocate the carriage, a first guide means at one end of the bed receiving the outer end of a first tube mounted on said bed to be bent; a heating element on said bed outwardly of said first guide means adapted to surround said tube at the bending region, said carriage on movement in one direction, on one side operably engaging the inner end of said tube for moving it outwardly of said bed in one direction, a bending arm at one end pivotally mounted adjacent said one end of said bed; and gripping elements on said bending arm operably engaging the outer end of said tube at said one end of said bed; the improvement comprising:

a second guide means at the other end of said bed adapted to alternately receive the outer end of a second tube to be bent;

a second heating element on said bed outwardly of said second guide means, adapted to surround the second tube at the bending region;

a second bending arm at one end pivotally mounted adjacent the other end of said bed;

gripping elements on said second bending arm, said second tube being insertable upon said bed after the initial bending of said first tube;

said carriage on movement in the opposite direction on its other side operably engaging the inner end of said second tube alternately projecting it outwardly of said bed in said opposite direction;

said gripping elements being adjustable on said bending arms for anchoring tubes of different diameter; and

clamping elements mounted upon the inner ends of said tubes and alternately engageable by said carriage.

4,022,046

METHOD OF AND APPARATUS FOR STRAIGHTENING STEEL SECTIONS

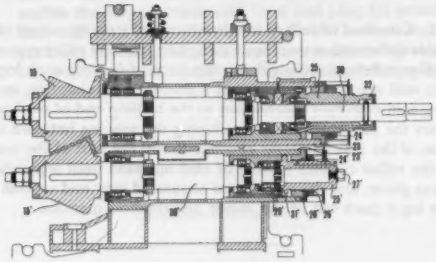
Shizuo Serizawa, and Seiichi Susahira, both of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 527,304, Nov. 26, 1974, abandoned. This application Jan. 21, 1976, Ser. No. 650,907

Claims priority, application Japan, Dec. 3, 1973, 48-136395

Int. Cl.² B21D 3/02

U.S. Cl. 72—161 **4 Claims**



1. A method of straightening a steel section which is formed monolithically of a main web portion and a flange or leg extending transversely of the web portion, comprising passing the steel section between a plurality of spaced pairs of roller contacting surfaces with the opposite sides of the main web portion and the flange each contacting one of the contacting surfaces, adjustably positioning in the axial direction thereof and in the direction relative to the other contacting surface in the pair one of the contacting surfaces of each pair of contacting surfaces for reducing at least the flange thickness of the steel section passing between the contacting surfaces, alternating the pairs of roller contacting surfaces so that in adjacent pairs of roller contacting surfaces the location of the adjustably postionable one of the contacting surfaces contacts opposite sides of the steel section, in each pair of contacting surfaces straightening the steel section with one roller contacting surface and pressing the steel section with the other contacting surface.

4,022,047

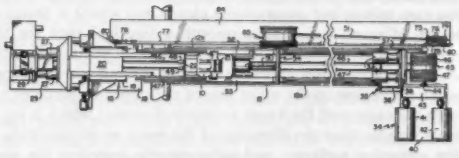
HOSE REEL FOR PIERCER AND REELER OUTLET TABLES

Robert A. Remner, Sewickley, and Donald G. Ries, Ellwood City, both of Pa., assignors to Aetna-Standard Engineering Company, Ellwood City, Pa.

Filed May 4, 1976, Ser. No. 682,918

Int. Cl.² B21B 17/10, 25/04, 19/04

U.S. Cl. 72—201 **7 Claims**



1. In a mill for the production of finite length tubing, a

positive drive hose reel apparatus for a fluid cooling system, which comprises

a. a thrust block carriage for supporting a mandrel bar,
b. means for linearly displacing said thrust block carriage between a working position and a retracted position,
c. a fluid cooling system mounted on said thrust block carriage to supply coolant to said mandrel bar,
d. a cylindrical hose reel means rotatably mounted on said thrust block carriage, and including a hose-receiving section and a cable-receiving section,
e. a hose element wound on said hose-receiving section and including a first end portion connected to said cooling system and a second end portion connected to a remote fluid supply means,
f. a cable element extending between points adjacent said working position and said retracted position,
g. means for securing said cable element at said points, and
h. said cable element being partially wound on said cable-receiving section, whereby the linear displacement of said thrust block carriage will impart positive rotational movement to said hose reel means thereby paying out and taking up said hose element as the thrust block carriage moves back and forth between the working and retracted positions.

4,022,048

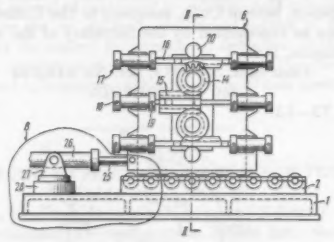
MILL FOR ROLLING CONTINUOUS CAST INGOTS

Evgeny Alexeevich Korshunov, pereulok Otdelny, 5a, kv. 29; Evgeny Zakharovich Freidenzon, ulitsa Lunacharskogo, 161, kv. 23; Vladimir Arkadievich Tyagunov, ulitsa Mira, 36/7, kv. 3; Mikhail Ivanovich Fedorov, ulitsa Komsomolskaya, 72, kv. 27, all of Sverdlovsk; Alexandr Ivanovich Kalinin, ulitsa Mira, 12, kv. 49, Nizhny Tagil; Konstantin Alexeevich Malikov, ulitsa Komsomolskaya, 59a, kv. 7, Sverdlovsk; Mikhail Iosipovich Arshansky, prospekt Lenina, 23/40, kv. 8, Nizhny Tagil; Igor Nikolaevich Petrov, ulitsa Malysheva, 152b, kv. 30, and Evgeny Valentinovich Melnikov, ulitsa Narodnogo, Fronta 56, both of Sverdlovsk, all of U.S.S.R.

Division of Ser. No. 422,071, Dec. 5, 1973, Pat. No. 3,939,896. This application Sept. 29, 1975, Ser. No. 617,577

Int. Cl.² B21B *13/18*

U.S. Cl. 72—214 **2 Claims**



1. A mill for rolling continuous cast ingots whose movements alternate with standstills, the mill comprising: a movable stand made up of two housings, intermediate of which a top housing and bottom-mill separators are secured; bearing chocks rigidly fixed in said housing; work-shaped horizontal rolls mounted in said chocks on bearings and featuring in their cross-sections at least one working portion with three sections — a shaped section arcuated so as to provide preset reduction along the length of the ingot being rolled, and two cylindrical sections at the edges of said shaped section, one of said cylindrical sections having a larger radius than the other, the thickness of said one cylindrical section corresponding to that of the rolled ingot and that of said other cylindrical section to the thickness of the ingot being cast, said rolls being furnished with gears mounted stationary at the edges of said rolls; drives for said rolls, constituting hydraulic rams coupled with a working-fluid supply source and fastened to said housings, with rods of said rams being connected to toothed racks that mesh with said gears; two vertical rolls set up on said housings on their inner sides behind said horizontal rolls when viewed in the direction of the movement of the rolled ingot, and adapted for tempering the side edges of the ingot being rolled; guide straps anchored at a bottom portion of said housings; a stage on which said stand is arranged; guides installed on said stage and made in the form of two pairs of vertical slideways with pivots mounting flanged supporting rollers, between which latter said guide straps transfer; a gear for idle transfer of said stand, during which transfer said horizontal rolls do not contact the ingot being rolled; said last-named gear being made as an idle stroke hydraulic ram mounted on said stage and coupled through a rod thereof with said stand; so that the latter is displaced by said drives of the horizontal rolls during the working stroke on account of frictional forces originating between said horizontal rolls that are brought into rotation by said hydraulic rams thereof, and the ingot being rolled, whereas the idle transfer of said stand is performed with the help of said idle-stroke hydraulic ram.

4,022,049

ROLLING MILLS

Hans Dieter Gerhards, Solingen-Grafrath, and Hermann Müllner, Dusseldorf-Oberkassel, both of Germany, assignors to Firma Friedrich Kocks, Dusseldorf, Germany

Filed July 16, 1975, Ser. No. 596,394

Claims priority, application Germany, Aug. 29, 1974, 2441337

Int. Cl.² B21B *17/00*

U.S. Cl. 72—234 **3 Claims**

1. In a rolling mill capable of both stretch-reducing tubes having relatively small external diameters and of reducing tubes having relatively large external diameters, which rolling mill comprises a plurality of successive roller stands, some stands having small roll diameters and other stands having large roll diameters, the improvement comprising a complete reversal of the order of the roller stands of a conventional mill capable of both stretch-reducing tubes of relatively small diameter and of and of reducing tubes of relatively large diameter so that the said other roller stands having large roll diameters being arranged in locations which are at the exit end of the rolling mill following the said some stands having small roll diameters.

4,022,050

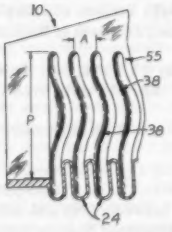
METHOD OF MANUFACTURING A HEAT EXCHANGER STEEL

Billy J. Davis, East Peoria; Harry J. Dawson, Dunlap; Ervin E. Mangus, Brimfield, and Kenneth J. Miller, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 4, 1975, Ser. No. 637,495

Int. Cl.² B21D *53/04*

U.S. Cl. 72—379 **6 Claims**



1. A method of manufacturing a heat exchanger sheet comprising;

foldably forming an elongated flat sheet of material into a

continuously corrugated sheet by feeding the flat sheet progressively through a forming apparatus, the corrugated sheet being formed with a plurality of deep transverse convolutions which extend across said sheet and with each transverse convolution extending longitudinally in a repetitive pattern; and

compressing the periphery of said corrugated sheet to provide a substantially flattened edge portion with a fully overlapping geometrically repetitive collapsed pattern of at least three thicknesses of sheet material while retaining a centrally disposed corrugated portion with minimal cold working thereof.

4,022,051
FEEDING APPARATUS OF MEMBERS TO BE CRIMPED IN CRIMPING TOOLS

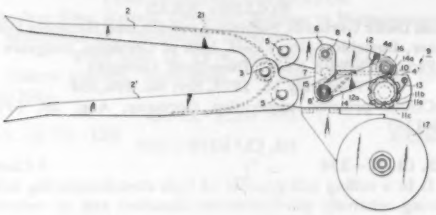
Selichi Ichikawa, No. 877-12, Fukuda, Sakai, Japan

Filed May 10, 1976, Ser. No. 684,899

Claims priority, application Japan, May 8, 1975, 50-61758[U]

Int. Cl.² B21D 7/06

U.S. Cl. 72—410 **6 Claims**



1. A crimping tool for individually feeding and crimping a plurality of workpieces removably secured to a belt comprising a lower jaw; an upper jaw coupled to said lower jaw so as to be movable relative thereto; a crimping projection provided on the said upper jaw; a receiving body including a plurality of receiving cavities for receiving the workpieces to be crimped, said body rotatably mounted on said lower jaw, said crimping projection being received by one of said receiving cavities so as to crimp a workpiece as said upper jaw moves toward said lower jaw; a ratchet wheel including a plurality of teeth coaxially mounted on said receiving body so as to be rotatable therewith; a spring mounted on said upper jaw so as to engage said teeth of said ratchet wheel, the movement of said upper jaw and spring away from said lower jaw for rotating said receiving body in a first direction so as to index the next workpiece received by a next said cavity preparatory to crimping; and a means for retaining the workpiece to be crimped in said cavity.

4,022,052
STAMPING PRESS WITH AUGMENTED POWER STROKE

Norman P. Hallenbeck, Vernon, and Stephen F. Willard, Andover, both of Conn., assignors to Hallenbeck Sales Co., Inc., Vernon, Conn.

Filed May 13, 1976, Ser. No. 686,000

Int. Cl.² B21J 9/18

U.S. Cl. 72—429 **5 Claims**

1. A stamping press with an augmented power stroke comprising:

A. a support having a guide portion;

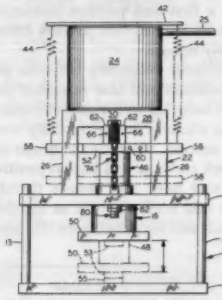
B. a ram slidably seated in said guide portion of said support for movement between first and second positions, said ram having an elongated passage therein extending parallel to the axis of movement thereof and a head portion at one end thereof adapted for mounting tool means thereon, said head portion being spaced from a work piece when said ram is in said first position thereof and being spaced adjacent the work piece in said second position;

C. rotatable means on the other end of said ram the axis of rotation thereof being generally perpendicular to the direction of movement of said ram;

D. piston means slidably seated in said passage of said ram;

E. drive means operatively connected to the end of said piston means adjacent said other end of said ram for reciprocation of said piston means in said ram;

F. elongated flexible connector means connected at one end



to said end of said piston means and at the other end to said support at a point spaced axially of said ram from said rotatable means towards said head portion thereof, said connector means extending about said rotatable means intermediate the length thereof whereby movement of said piston means within said ram toward said head portion thereof simultaneously effects movement of said ram from said first to said second positions thereof; and

G. means for returning said ram from said second to said first positions thereof.

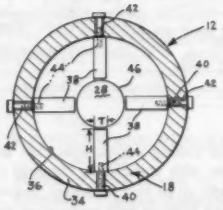
4,022,053
PROJECTILE GUIDE TRACK

Robert N. Teng, Huntington Beach, and William B. Covey, Long Beach, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 30, 1975, Ser. No. 618,094

Int. Cl.² G01N 3/30

U.S. Cl. 73—12 **4 Claims**



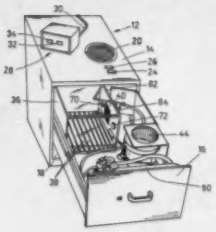
1. In a ballistic range of the type utilized for the testing of specimens having a means for propelling a projectile, a projectile guide track and a test environment, the improvement therein being said projectile guide track, said projectile guide track comprising at least one pair of track assemblies, each of said track assemblies having a female end section at one end thereof and a male end section at the other end thereof, each of said end sections having an externally threaded portion thereon, said track assemblies having adjacent male and female end sections in mating relationship with one another, a flanged ring having internal threads thereon engaging each of said externally threaded portions of said track assemblies and

means for securing adjacent flanged rings together thereby aligning said track assemblies in a predetermined orientation, said track assemblies being in operative alignment with said propelling means and said test environment, each of said track assemblies being formed of a cylindrical casing having a predetermined internal dimension and four solid, rigid rails circumferentially spaced an equidistance from one another within said casing, each of said rails having means therein for accepting a fastening element, each of said fastening elements allowing for said rail associated therewith to be removably, yet fixedly secureable to said casing and each of said rails being of a precise predetermined height and thickness whereby said projectile propelled by said propelling means remains in proper alignment throughout its passage through said projectile guide track.

4,022,054
METHOD AND APPARATUS FOR USE IN DETECTING FAINT OLFACTORY STIMULI

Gerald Bernard Biederman, 113 Argonne Crescent, Willowdale, Ontario, Canada

Filed Sept. 30, 1975, Ser. No. 618,046
Int. Cl.² G01D *21/00*
U.S. Cl. 73—23 **13 Claims**



1. Apparatus for use in detecting presence or absence of a scent, comprising a cage harbouring an animal sensitized to recognize said scent in relatively low concentration; means for passing an air current through the cage at a rate which will permit sampling of the air current by the animal and recognition by the animal of said scent at or above said concentration entrained in the air current, and signal means in the cage operable by the animal in response to detection of said scent in said air current; said animal being trained to operate said signal means in response to the detection of said scent in said air current.

4,022,055
PULSE-ECHO METHOD AND SYSTEM FOR TESTING WALL THICKNESSES

Norman E. Flournoy; David A. Morris, and Robert J. Agnew, all of Richmond, Va., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 2, 1974, Ser. No. 528,974
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.7 **4 Claims**

1. In a pulse-echo system for measuring wall thickness of pipes or the like, the improvement comprising in combination,

means for generating a single pulse directed along a path that is longitudinal relative to said pipe wall,

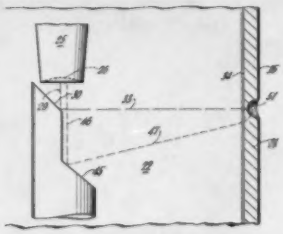
means for splitting said single pulse to form first and second named pulses,

said splitting means comprising first and second reflecting surfaces,

said first reflecting surface having an angle relative to said longitudinal path such that said first named pulse is directed transversely relative to said pipe wall for making said wall thickness measurement,

said second reflecting surface having an angle relative to said longitudinal path such that said second named pulse is directed at an angle of incidence relative to said wall that is greater than the critical angle of refraction in order to permit any reflected energy from a discontinuity in said wall to be returned along the same path,

said second reflecting surface being non-contiguous with said first reflecting surface and having an offset along said



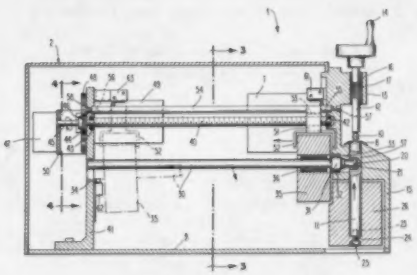
longitudinal path for causing a time delay of said second pulse relative to said first pulse, and

means for receiving any reflected pulses from both said first and second named pulses whereby said wall thickness may be measured and any discontinuity may be characterized.

4,022,056
HARDNESS TESTING APPARATUS

Lauri C. Barland, Box 265, West Chester, Pa. 19380

Filed Dec. 12, 1975, Ser. No. 640,289
Int. Cl.² G01N *3/08*, *3/40*
U.S. Cl. 73—78 **16 Claims**

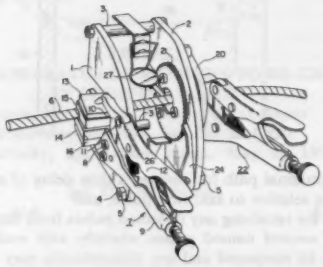


1. A hardness testing apparatus for testing the hardness of tablets by measuring the compressive force required to fracture the same comprising spaced apart upper and lower anvils, said lower anvil for applying an upward force to said tablet, said upper anvil being vertically adjustable to hold said tablet against said lower anvil and means for securing said upper anvil in fixed position to resist said compressive force when applied by said lower anvil, lever means for applying an increasing upward force to said lower anvil, said lever means comprising a pivotally mounted element in operative engagement with said lower anvil, a weight mounted on said pivotally mounted element and laterally movable relative thereto, drive means for moving said weight laterally, and display means operatively connected to said drive means for indicating the force applied to said tablet as a function of the movement of said drive means, control means for operating said drive means and means for holding said display on fracture of said tablet.

4,022,057
EXPANDING TOOL FOR NONDESTRUCTIVE INSPECTION OF FLEXIBLE WIRE ROPE

John L. Bachman, Taneytown, Md., and Joseph M. Krafft, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 12, 1976, Ser. No. 704,155
Int. Cl.² G01N 3/26
U.S. Cl. 73—99 3 Claims

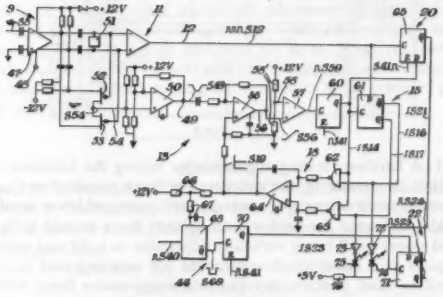


1. A tool for non-destructive testing of flexible wire rope which comprises:
first and second gripper pliers secured relative to each other,
said first gripper plier fixed against rotation,
said second gripper plier rotatable relative to said first gripper plier,
whereby a portion of a wire cable held between the jaws of said first and second gripper pliers may be untwisted by rotation of said second pliers relative to said first pliers for a visual observation of the innermost wires.

4,022,058
APPARATUS FOR DETERMINING THE ARRIVAL TIME OF ALTERNATING SIGNALS

Alvin E. Brown, 2865 N. Mountain Ave., Claremont, Calif. 91711

Filed Aug. 7, 1975, Ser. No. 602,918
Int. Cl.² G01F 1/66
U.S. Cl. 73—194 A 15 Claims

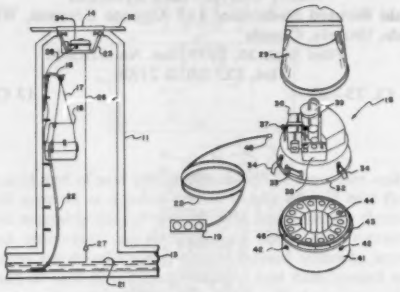


15. Apparatus for ascertaining the time of arrival of an alternating signal comprising:
arrival delay means responsive to the commencement of said signal for generating and arrival delay signal,
a zero crossover detector responsive to the zero crossing of said alternating signal in a first sense after said delay signal for generating a time signal corresponding to said time of arrival,
regulating means responsive to said arrival delay signal and to the preceding zero crossing of said alternating signal in a second sense opposite said first sense for adjusting the timing of said arrival delay signal to correlate in time with said second sense zero crossing, whereby said arrival delay signal always immediately precedes said first sense zero crossing.

4,022,059
FLOW AND TIME PROPORTIONAL SAMPLING SYSTEM

J. Gordon Schontzler, and Wendall C. Gates, both of Santa Cruz, Calif., assignors to Manning Environmental Corporation, Santa Cruz, Calif.

Continuation-in-part of Ser. No. 455,879, March 28, 1974, abandoned. This application Aug. 15, 1974, Ser. No. 497,569
Int. Cl.² G01F 1/02; G01N 1/14
U.S. Cl. 73—198 47 Claims



1. In a system of the type described for communication with a fluid
means for measuring a predetermined volume of fluid, said means for measuring including a sample chamber, a level sensor for determining a predetermined fill level in said chamber and mounted outside said chamber, a fill tube member projecting into said chamber having an open end in communication with said chamber in fixed position closely spaced to the lower boundary of said chamber whereby influx and eflux through said open end is unimpeded by suspended solids in the fluid, said fill tube member having an opening in the side thereof spaced above said open end, and means for adjusting said opening in vertical position,
means cooperating between said measuring means and said fluid to provide for transfer of fluid therebetween,
and means for selectively operating said measuring means to purge said measuring means, fill said measuring means, measure said predetermined volume, transfer said predetermined volume, and final purge said measuring means thereby providing sampling of the fluid.

16. In a fluid flow measuring system having a flow sampler actuated by a power source and responsive to an input signal including
a flow meter for providing the input signal,
means connected to the power source for providing positive and negative pressure,
a sample chamber for measuring a predetermined fluid sample volume in communication with said means for providing positive and negative pressure,
a fill sensor for sensing when said sample chamber is filled to a level at least as great as said predetermined sample volume, said fill sensor being located externally of said sample chamber, whereby fouling of said fill sensor by caustic samples or foreign matter therein is prevented,
said fill sensor operating to terminate negative pressure in said sample chamber and to initiate positive pressure therein, thereby expelling fluid through said means for communicating so that the fluid volume in said sample

chamber is reduced to said predetermined sample volume,

means for communicating the fluid flow with said sample chamber,

means for storing said predetermined sample volume,

means for transferring said predetermined sample volume from said sample chamber to said means for storing, and timing means for providing a sampling sequence cycle, said timing means connected to said means for providing pressure, said sample chamber, and said means for transferring, whereby said positive and negative pressure is alternately communicated with said sample chamber to purge, fill and measure a sample therein, and to transfer the sample to said means for storing.

4,022,060

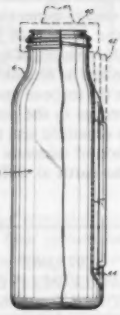
INFANTS' FEEDING BOTTLE

Horst Rebhan, P.O. Box 10, D-8641 Stockheim, Germany

Continuation-in-part of Ser. No. 413,590, Nov. 7, 1973, abandoned. This application Oct. 2, 1975, Ser. No. 619,069

Int. Cl.² A61J *9/02*

U.S. Cl. 73—343 B **12 Claims**



1. In an infants' feeding bottle having a bottom wall, an outside wall and an upwardly tapering neck portion and having a longitudinal slot defined along the outside wall of the bottle, the slot having no communication with the bottle interior, the maximum width of the slot exceeding the width of the slot opening in the external bottle wall surface, the improvement comprising, in combination:

the lower end of the slot terminating above the level of the bottom wall of the bottle and the upper end of the slot extending above the level of the juncture of the bottle wall and the tapered neck portion and merging into the tapered neck portion;

an elongate sheath having a transparent portion, the sheath being removably received within and in frictional engagement with the slot; and an indicating device contained within the sheath.

4,022,061

CENTROID TARGET FLOW METER

Robert E. Schendel, 10298 Hammerly, Houston, Tex. 77043

Filed Nov. 17, 1975, Ser. No. 632,636

Int. Cl.² G01F *1/28*

U.S. Cl. 73—228 **14 Claims**

1. A flow meter adapted for use in various configurations of conduit and levels of flow therein comprising

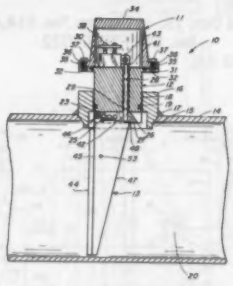
a housing connected to said conduit;

b. a target means adapted for insertion into said conduit area for providing a constant centroid target area for the fluid relative to said conduit area for any level of fluid in said conduit;

c. a meter body means adapted for connection to said housing;

d. a mounting means for removably connecting said target means to said meter body means for movement;

e. a force transfer means in relation to said target means for limited movement and for constant proportional transfer of force from said target means to said force means in response to fluid level and movement in said conduit;



f. transducer means connected to said meter body means for receiving said force from said force transfer means to measure the fluid flow as a function of the force on said force transfer means.

4,022,062

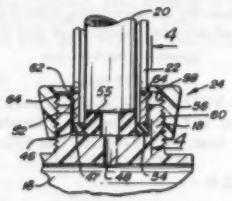
GAUGE GLASS SHIELD

Donald R. Basel, Garfield Heights, and Raymond P. Kawolics, Solon, both of Ohio, assignors to Tomlinson Industries, Inc., Cleveland, Ohio

Filed May 14, 1975, Ser. No. 577,547

Int. Cl.² G01F *23/02*

U.S. Cl. 73—325 **9 Claims**



1. A gauge glass assembly comprising:

a mounting member having an upwardly open receptor bore with a bottom wall;

a tubular member defining a gauge glass portion on the inside thereof having a bottom end positioned in said bore and extending upwardly therefrom and terminating in an upper end, said tubular member including at least one elongated axially extending opening therein to permit visual observation of the gauge glass portion throughout a substantial portion of its length, said opening having a lower edge which is spaced adjacent said bottom end and outwardly of said receptor bore, said tubular member including an integrally formed outwardly extending flange defined by at least one outwardly extending tab comprised of a portion of the parent material of said shield member deformed outwardly from adjacent said opening lower edge; and,

a lower nut member carried about the lower end of the tubular member and threaded to said mounting member, said lower nut member including an inwardly extending flange area adapted to engage the upper surface of said at least one outwardly extending tab such that threaded advancement of said lower nut on said mounting member

causes the tubular member to be driven axially toward the receptor bottom wall.

4,022,063

ELECTROMECHANICAL DIGITAL THERMOMETER

Roger A. West, Minneapolis, Minn., and Winston Dale Ream, Salt Lake City, Utah, assignors to RWB Labs, Hacienda Heights, Calif.

Filed Oct. 15, 1974, Ser. No. 514,442
Int. Cl.² G01K 7/22
U.S. Cl. 73—362 AR 9 Claims

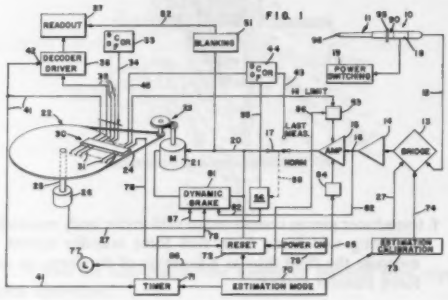


FIG. 1

1. A probe assembly for a thermometer, comprising:

a. a generally tubular elongated probe, said probe having a temperature sensing element near one end thereof; and

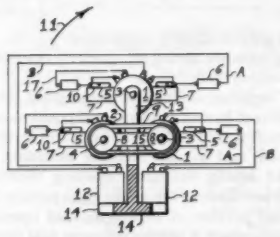
b. a generally tubular probe cover adapted to fit over said one end of the probe, said cover having a tip whose normal inside dimension is slightly smaller than the corresponding outside dimension of the temperature sensing end of the probe, so as to provide an interference fit to hold the probe cover on, the internal cross sectional dimensions of the cover, except for the tip, being generally larger than the corresponding exterior cross sectional dimensions of adjacent portions of said probe.

4,022,064

GRAVITY AND VELOCITY-CHANGE DIFFERENTIATOR

James N. Preston, 1633 W. Campbell, Phoenix, Ariz. 85015

Filed Mar. 31, 1976, Ser. No. 672,465
Int. Cl.² G01V 7/12
U.S. Cl. 73—382 R 4 Claims



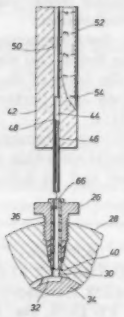
1. A portable gravity-measuring device comprising: an electric generator having a rotor assembly and a stator assembly, the rotor assembly including an axle and the stator assembly including housing means; the axle of the rotor assembly rotatably mounted within the stator assembly on bearing means supported by the housing means; outside the stator housing means, the axle rotatably mounted on low-friction bearing means which are supported by support means of the gravity-measuring device so that the stator assembly is free to counter-rotate around the axle; the invention including an eccentric arm of some weight affixed to the stator assembly; a gravity-actuated electric switching means affixed to the eccentric arm assembly so that the force of gravity of the earth operates to close the electric switching means whenever the eccentric arm assembly rotates downward around the horizontal axle to any altitude above the surface of the earth lower than that of the horizontal plane of the axle and so that the gravity of the earth operates to open the electric switching means whenever the eccentric arm assembly is rotated upward to any altitude higher above the earth than that of the horizontal plane of the axle; the gravity-measuring device including a motor to rotate the rotor assembly of the generator through its axle; an electric circuit electrically-connecting the electrical leads of the generator together in series circuit through the gravity-actuated electric switching means and through electric energy-measuring means that operate to precisely measure and indicate the amount of electrical energy flowing through the generator circuit in the operation of the gravity-measuring device; the action of the magnetic force between the rotor and stator assemblies of the generator operating to maintain the eccentric arm in the horizontal position in the horizontal plane of the axle in opposition to the force of gravity of the earth; the operation of the gravity-actuated electric switching means operating to limit the altitude of the eccentric arm to that of the horizontal plane of the axle above the earth; the operation of the electric energy-meausring means to precisely measure the amount of electric energy generated by the generator at different locations on the surface of the earth operating to indicate differences in the amount of magnetic force required by the generator to maintain its eccentric arm in its horizontal position in opposition to the force of gravity of the earth which thereby indicates differences in the pull of the gravity of the earth on the mass of the eccentric arm thereat which indicates the presence and absence of minerals and water located beneath the surface of the earth at different locations on the surface of the earth.

4,022,065

CALIBRATED SAMPLE DELIVERY APPARATUS ACCOMMODATING OFFSET ERROR

James A. Ramin, 2802 White Oak, Houston, Tex. 77007, and Stanley D. Stearns, 7812 Bobbitt, Houston, Tex. 77055

Filed Feb. 19, 1976, Ser. No. 659,373
Int. Cl.² G01N 1/10
U.S. Cl. 73—422 GC 10 Claims



1. A sample injection apparatus for use with a sample injection valve having multiple ports, one port being a sample injection port which valve incorporates an internal passage of specified volume extending to a movable valve element wherein the internal passage is a part of a connecting volume which connecting volume represents that volume of a specimen supplied to said sample injection valve which is not supplied by the valve on operation of the valve at the time that a sample is transferred thereby, and wherein said valve is adapted to be connected to a sample test apparatus and the

valve is further operable between at least two positions, one position enabling injection of a sample into said sample injection port, and the other of said positions isolating said sample injection port on operation of said valve element and wherein the valve cooperates with an apparatus comprising:

a sample injection syringe, said syringe having a needle which inserts into the port of a valve and which syringe is adapted to receive, store and measure against a set of calibrations thereon a volume of sample.

4,022,066

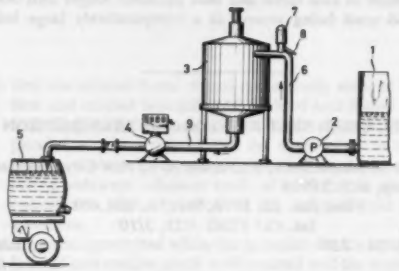
APPARATUS FOR REMOVING LIQUID SAMPLES

Manfred Kaune, Wendhausen, Germany, assignor to Diessel GmbH & Co., Hildesheim, Germany

Continuation-in-part of Ser. No. 512,857, Oct. 7, 1974, Pat. No. 3,995,486. This application Oct. 7, 1975, Ser. No. 620,284

Int. Cl.² G01N *1/14*

U.S. Cl. 73—422 R **13 Claims**



1. In an apparatus for removing liquid samples, especially milk samples, from a flow system having a feed pump, an electro 0 magnetically actuated and normally closed metering valve physically located at a higher lever than said feed pump, an air eliminator and a volume meter sequentially arrayed downstream, the improvement comprising:

a flow line (6) connecting said feed pump and said air eliminator, said metering valve (7) connected to said flow line (6) by a short connecting pipe (15) and sealed by closing element (11), a drain tube (8) of said valve leading to a sample container issuing above said closing element (11) and defined by a channel (14) traversed by a valve shaft (13), and defining an annular gap (29) between the outer surface of said valve shaft (14) and a wall of said channel (14), said channel having a given cross section to pass the amount of liquid sample to be removed, said metering valve (7) and said valve shaft (13) vertically positioned, and control means (36,37,38) for adjusting the duration and the frequency of the openings of metering valve (7) are provided, said control means upon termination of flow of a first quantity of liquid allowing activating at least once more said metering valve (7).

4,022,067

RAPID-ACTION AUTOMATIC SAMPLING APPARATUS

István Murányi, and György Harsányi, both of Budapest, Hungary, assignors to Labor Muszeripari Muvek of Esztergom, Rudas Laszlo, Hungary

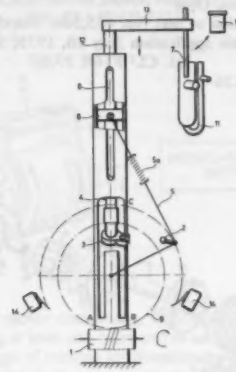
Filed Feb. 26, 1976, Ser. No. 661,503

Claims priority, application Hungary, Mar. 7, 1975, LA 859

Int. Cl.² G01N *1/14*

U.S. Cl. 73—423 A **2 Claims**

1. Rapid-action automatic sampling apparatus comprising an intermittently operable sampling probe adapted for immersion alternately into a sample-containing vessel and a washing vessel, an arm for carrying the sampling probe, a vertically reciprocable lifting rod to which said arm is secured and which is, additionally, rotatable about its own longitudinal axis, a crank mechanism connected to said rod for lifting and lowering the latter, a swivel arm included in said crank mechanism, and a spring element included in the said swivel arm so that its arm length is resiliently variable, an angular displacement mechanism for rotating the said rod between two angular positions corresponding to the positions of said vessels, a



mounting for the said rod enabling it to perform its reciprocatory and rotary movements, the said angular displacement mechanism being connected to the said rod, to the said mounting of the rod and to the said swivel arm, and driving means connectable to the said crank mechanism for driving the latter.

4,022,068

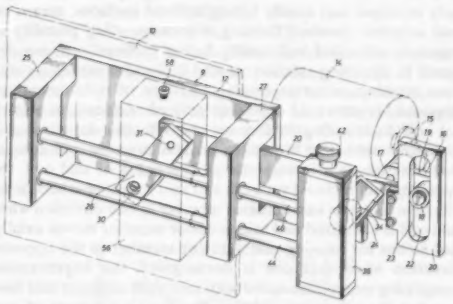
ADJUSTABLE WELDING HEAD OSCILLATOR

Clyde M. Slavens, Houston, Tex., assignor to Central Welding Supply Co., Inc., South Houston, Tex.

Filed Feb. 24, 1975, Ser. No. 552,133

Int. Cl.² F16H *25/08*

U.S. Cl. 74—54 **13 Claims**



1. An apparatus for the adjustable oscillation of a welding head mounted thereon, said apparatus comprising:

a transverse power cam adapted for rotary motion;

a cam follower engaged by a roller of said power cam, said cam follower adapted for translating the rotary motion of said power cam into reciprocatory motion;

a swing bar affixed at a point along its length to said cam follower, said swing bar having an end pivotally mounted at a fixed point remote from said cam follower; and

a transverse adjustment mechanism pivotally and slidably connected to and engaged by said swing bar, said adjustment mechanism adapted for positioning a welding head with respect to said swing bar, to be responsive to the

movement of said swing bar, said adjustment mechanism being reciprocated in substantially planar motion.

4,022,069

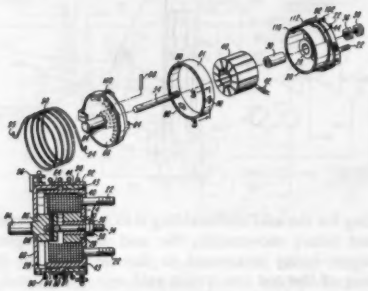
ROTARY ACTUATOR MECHANISM

Raymond W. Boyer, Dayton, Ohio, assignor to William R. Jacox, Dayton, Ohio

Continuation of Ser. No. 455,500, March 27, 1974, abandoned. This application July 28, 1975, Ser. No. 599,849

Int. Cl.² F16H *27/02*

U.S. Cl. 74—126 **10 Claims**



1. In a rotary actuator device including a base member having a projecting core, an actuator member having a projecting core positioned in opposing spaced relation to said core of said base member, a shaft connected to said actuator member and extending through a bore within said base member, said actuator member being supported for both rotary and axial movement relative to said base member and said shaft being connected to move axially with said actuator member, means on said base member forming a plurality of angularly arranged and axially facing inclined surfaces, means on said actuator member forming a corresponding plurality of angularly arranged and axially facing inclined surfaces disposed in opposing relation to said inclined surfaces on said base member, a corresponding plurality of roller members disposed between said opposing inclined surfaces, an electrical coil surrounding said cores and effective to move said actuator member in an axial direction towards said core of said base member in response to energizing of said coil, the opposing said inclined surfaces and said roller members being effective to rotate said actuator member in one direction when said coil is energized and said actuator member moves axially, and means for rotating said actuator member in the opposite direction when said coil is deenergized, the improvement comprising means associated with said shaft adjacent said base member for adjustably limiting the axial movement of said shaft and said actuator member for precisely adjusting the angle of rotation of said actuator member is said one direction.

4,022,070

ENDLESS POWER TRANSMISSION BELT

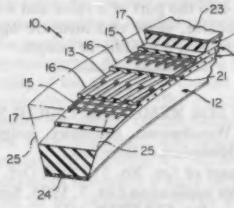
Jerry D. Wolfe, Springfield, Mo., assignor to Dayco Corporation, Dayton, Ohio

Filed Apr. 22, 1976, Ser. No. 679,265

Int. Cl.² F16G *1/00, 5/16*

U.S. Cl. 74—231 P **23 Claims**

1. An endless power transmission belt body comprising, a tension section, a compression section, a continuous longitudinally extending load-carrying cord disposed between said sections and defined by a plurality of helically wound turns, and a platform on at least one side of said load-carrying cord, said platform having a fabric base layer and an elastomeric cord-engaging layer, said fabric base layer supporting said



plurality of turns in precise rectilinear alignment at any cross section along said belt to provide substantially equal load distribution in said turns and thus promote longer belt body life, said cord being wound at a comparatively large helix angle.

4,022,071

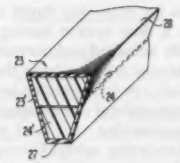
STEEL CORD BELT REINFORCED TRANSMISSION BELT

Michael R. Abatemarco, 53 Parker Ave., New City, Rockland County, N.Y. 10956

Filed Jan. 22, 1976, Ser. No. 651,401

Int. Cl.² F16G *1/22, 5/10*

U.S. Cl. 74—237 **5 Claims**



1. A power transmission belt comprising a belt body formed of elastomer and having inner and outer parallel faces, and at least one flexible steel cord belt reinforcement for said transmission belt bonded integrally therewith and extending from side-to-side thereof and continuously longitudinally of the transmission belt, said steel cord belt comprising a relatively thin assemblage composed of two adjacent layers of flexible steel wires, each layer of wires being arranged in closely spaced side -by-side relationship and on an opposite bias relative to the longitudinal axis of the transmission belt, the plane of said reinforcement being parallel to said inner and outer faces.

4,022,072

SPROCKET DEVICE FOR USE IN A TRACK-TYPE TRACTOR

Chikashi Chagawa, and Sumio Yoshinouchi, both of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Continuation-in-part of Ser. No. 482,897, June 25, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,168

Claims priority, application Japan, Feb. 21, 1974, 49-20156[U]

Int. Cl.² F16H *55/14, 55/30*

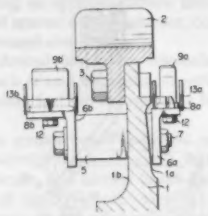
U.S. Cl. 74—243 R **6 Claims**

1. A sprocket device for driving an endless track of a track-type tractor comprising:

a. a plurality of first and second brackets fixedly secured to

both sides of a sprocket body, respectively, along the periphery of the sprocket body at predetermined intervals

b. a plurality of first buffer members each being replaceably secured to each of said first brackets on one side of said sprocket body and a plurality of second buffer members each being replaceably secured to each of said second brackets on the other side of said sprocket body wherein the width of each of said first buffer members is less than the width of said second buffer members, and



c. first and second frame means respectively secured to said first and second brackets and each of said frame means including walls extending from each of said brackets parallel to and spaced from the sides of each of said buffer members for preventing said buffer members from falling sideways wherein each of said frame means is coextensive with a portion of the sides of said buffer members,

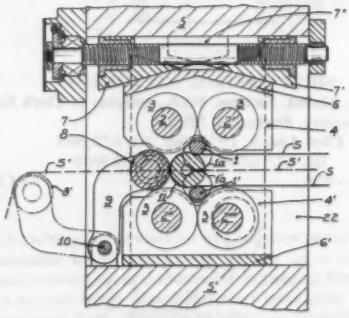
whereby noise generated when the sprocket device is engaged with links of said endless track is eliminated and the endurability of said buffer members is remarkably improved.

4,022,073

ROLL DRIVE FOR CLUSTER MILLS

Tadeusz Sendzimir, P.O. Box 1350, Waterbury, Conn. 06720

Filed Nov. 12, 1975, Ser. No. 631,117
Int. Cl.² F16H *57/00*; B02C *1/08*
U.S. Cl. 74—410 **12 Claims**



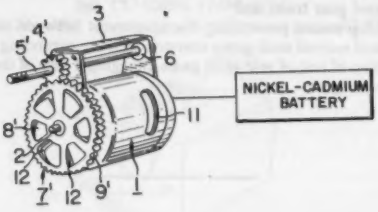
1. A cluster mill having a housing, a pair of cooperating work rolls, each work roll supported by two parallel lines of casters, and having an end portion, a roll drive for each work roll comprising a first bevel gear keyed to the end portion of said work roll, a motor located on top of said housing and having a shaft, a second bevel gear keyed to said motor shaft and meshing with said first bevel gear, said bevel gearing mounted in a gear box attached to said housing by universal linkage, said linkage having means to absorb torque reactions of said work roll and said motor, and having means to exert upward pressure on said gear box to render it weightless.

4,022,074

COOLING DEVICE

Kenichi Mabuchi, Tokyo, and Yoshihisa Tsuchimochi, Ichikawa, both of Japan, assignors to Mabuchi Motor Co. Ltd., Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,761
Claims priority, application Japan, Feb. 27, 1974, 49-22681
Int. Cl.² F16H *1/12*
U.S. Cl. 74—421 A **7 Claims**



1. A miniature motor comprising, in combination:

a. a case having at least one inlet and at least one outlet slot for the passage of cooling air therethrough;

b. a rotatable drive shaft extending through a portion of said case;

c. a gear frame attached to said case;

d. a driven shaft rotatably journalled in said gear frame;

e. a driven gear secured to said driven shaft for rotation together therewith; and

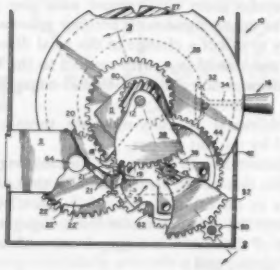
f. a drive gear secured to and rotatable with said drive shaft and a fan formed integrally with said drive gear, said drive gear including a plurality of spokes with said fan being formed in openings provided between said spokes of said drive gear, said drive shaft being only as long as is necessary to support said drive gear but not said fan which is positioned so as to direct a flow of air into said inlet slots when said drive gear and said driven gear are in meshing engagement with each other and said drive shaft is rotated.

4,022,075

INTERVAL TIMER

Maurice E. Schuder, Indianapolis; David W. Underwood, Clayton, and Richard H. Weber, Indianapolis, all of Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 522,975, Nov. 11, 1974, abandoned, and a continuation of Ser. No. 404,850, Oct. 10, 1973, abandoned. This application Oct. 31, 1975, Ser. No. 627,716
Int. Cl.² F16H *55/04*
U.S. Cl. 74—437 **5 Claims**



1. An interval timer comprising:

a. an axle;

b. a drum rotatably carried about said axle, and indicia

disposed about a periphery of said drum and spaced in a logarithmic scale;

c. means for manually setting said drum at a predetermined indicia setting;

d. a first snail gear carried by said drum;

e. a second snail gear meshing with said first snail gear;

f. a motor coupled through a gear train to said gear member;

g. a partial gear fixedly carried for rotation by said second snail gear and having a hub and teeth extending around a portion of said hub and meshing with teeth of a gear of said gear train; and

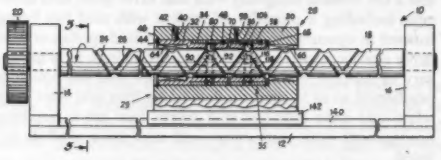
h. stop means preventing disengagement between said first and second snail gears comprising a lug extending from a step of one of said snail gears engaging a step of the other snail gear.

4,022,076

ANTI-BACKLASH AUTOMATICALLY REVERSING NUT FOR A DIAMOND THREAD SCREW

Joseph R. Metz, Georgetown, Conn., assignor to Norco, Inc., Ridgefield, Conn.

Filed Feb. 17, 1976, Ser. No. 658,623
Int. Cl.² F16H *55/18, 27/02, 1/18, 55/22*
U.S. Cl. 74—441 **28 Claims**



1. An anti-backlash reversing nut assemblage for use with a diamond thread screw having threads defining criss-crossed thread grooves, comprising in combination:

a. a nut proper adapted to receive the screw,

b. a follower axially movable with respect to said nut proper and having an opening for receiving the screw,

c. a non-shiftable thread-engaging ball carried by the follower and extending partially into the opening thereof,

d. means mounting said ball against lateral movement on the follower,

e. a laterally-movable thread-engaging ball carried by the follower and extending partially into the opening thereof,

f. guide means on the follower for enabling the movable ball to be translationally shifted with respect thereto in directions substantially parallel to the screw axis whereby it can transfer from engagement with one groove of the screw to engagement with another groove of the screw, thereby to effect a change in the axial direction of travel of the nut assemblage with respect to the screw,

g. an addtional non-shiftable thread-engaging ball carried by the nut proper,

h. an additional laterally-movable thread-engaging ball carried by the nut proper,

i. guide means on said nut proper for enabling the additional movable ball to be translationally shifted with respect thereto in directions substantially parallel to the screw axis whereby it can transfer from engagement with one groove of the screw to engagement with another groove of the screw, and

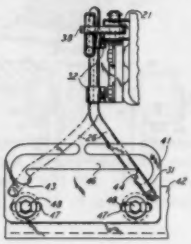
j. spring means for biasing the nut proper and follower in opposite axial directions with respect to one another, thereby to minimize looseness of the assemblage on the threads of the screw.

4,022,077

CONTROL MEANS WITH A SPRING LEVER

Lloyd A. Brewer, West Terre Haute, and Lynn R. Moseman, Terre Haute, both of Ind., assignors to J. I. Case Company, Racine, Wis.

Continuation of Ser. No. 489,787, July 18, 1974, abandoned.
This application Feb. 5, 1976, Ser. No. 655,386
Int. Cl.² B60K *20/00*
U.S. Cl. 74—473 R **9 Claims**



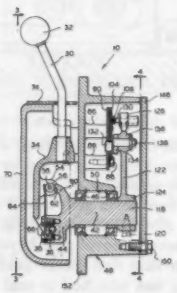
1. A control means with a spring lever for use in setting a device in two different positions, comprising a pivotally mounted lever of a spring material which is resilient and thereby capable of bending throughout its length to be recoverably sprung into a position for storing energy in said lever, said lever having opposite end portions extending on opposite sides of and away from the pivot mounting and with one of said end portions being a handle and with the other of said end portions including a connection portion arranged to connect to the device being controlled by said control means, and a member disposed adjacent the extending end of said handle and having two notches for lever-restraining positions and with said notches faced oppositely from each other and arranged and spaced apart in the directions transverse to the axis of pivot of said lever and spaced apart a distance within the bending capacity of said lever, for engaging said handle alternately in said two notches and thereby restrain said handle when said connection portion of said lever is cconnected to and restrained by said device, and said member having a slot extending between said notches for sliding movement and control of said handle in its movement between said notches.

4,022,078

SHIFT CONTROL MECHANISM

Theodore A. Malott, Jackson, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Apr. 5, 1976, Ser. No. 673,503
Int. Cl.² G05G *9/12;* **H01H** *9/00*
U.S. Cl. 74—475 **12 Claims**



1. In a vehicle shift control mechanism of a character

adapted for installation at an operator control station for regulating a transmission control circuit, the combination of:

a. a shift control housing;

b. a shift control lever;

c. first means for mounting said lever in said housing for angular movement between a plurality of consecutively arranged transmission settings respectively corresponding to the transmission speed ratios, said mounting means also serving for mounting a pivot arm member spaced from said angularly movable with said lever;

d. a control plate mounted in said housing, said control plate having an arcuate surface that is provided with a plurality of spaced detent cut-outs, corresponding to each of said transmission setting;

e. a biaset detend device for releasably maintaining said lever in each of said transmission settings, thereby affording a distinct "feel" to the operator for each transmission setting;

f. an electric circuit board mounted on said control plate and operatively interconnected with said transmission control circuit, said circuit board being provided with a plurality of spaced electric proximity switches corresponding to at least a substantial number of said transmission settings as well as each of said detent cut-outs; and

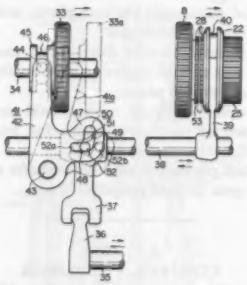
g. magnet means, provided on said pivot arm member, in axial non-contacting alignment with said switches, said magnet means being adapted to be centered relative to each of said switches, by said detent device, as said pivot member is angularly displaced relative to said circuit board via the action of said lever, with said switches being activated by said magnet means as it passes thereover.

4,022,079

SHIFTING MECHANISM FOR POWER TRANSMISSION

Yoshiaki Hidaka, Wako, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1976, Ser. No. 652,135
Claims priority, application Japan, Jan. 31, 1975, 50-12310
Int. Cl.² G05G *5/10*
U.S. Cl. 74—476 **4 Claims**



1. A shifting mechanism for five-stage or three-stage power transmission in an automotive vehicle of a construction, wherein a reverse gear is interposed between a first speed gear and a second speed gear fitted on a main gear shaft and a counter gear shaft, and a driving force is transmitted from a main reverse gear to a counter reverse gear through a reverse idle gear, said mechanism comprising:

an oscillatable shift lever for shifting said reverse idle gear;

an L-shaped control slot formed in one part of said shift lever, and having a vertical section and a horizontal section;

a control pin slidably engaged with said L-shaped control slot; and

a shift fork shaft for the fifth or third speed gear which is fixed to said control pin,

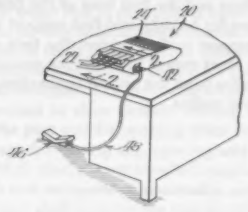
shifting of said control pin being permitted by the horizontal section of said control slot to maintain said shift lever in an unmovable state at the time of shifting to the fifth or third speed gear, while shifting of said control pin being transmitted to said shift lever by the vertical section of said L-shaped control slot.

4,022,080

TRANSCRIPTION MECHANISM FOR TAPE PLAYER

Mario E. Bachmann, 2 E. Oak St., Chicago, Ill. 60611

Filed Aug. 29, 1975, Ser. No. 608,965
Int. Cl.² G05G *11/00*, *1/14*
U.S. Cl. 74—481 **22 Claims**



1. A transcription mechanism for use with tape players of the type having a plurality of control members, each selectively movable between a neutral position and an operative position in which the tape player is operated in one of a plurality of possible operating modes corresponding to the selected control member, comprising:

controller means adapted to be positioned in operative relationship with selected ones of said control members;

said controller means includng actuator means selectively actuatable to engage selected ones of said control members for effecting movement thereof into said operative position;

means located remotely from said controller and selectively operable between neutral and operative positions for effecting selective actuation of said actuator means; and

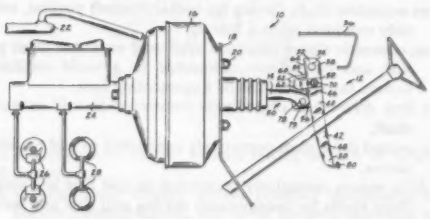
means connecting said remote means to said controller means for effecting actuation of said actuator means in response to operation of said remote means.

4,022,081

BRACKET FOR A BRAKE PEDAL

Thomas E. Dodd, and James B. Putt, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Dec. 24, 1975, Ser. No. 644,246
Int. Cl.² G05G *1/14*
U.S. Cl. 74—512 **4 Claims**



1. A pedal adapter for transmitting an operational input force from an operator to a push rod; said pedal adapter comprising:

lever means having a first end pivotally connected to a support and a second end; said lever means having a first section perpendicularly extending from said support to a second section, said second section being offset at an angle from said first end to avoid interference with a stationary column, said second section being connected

to a third section substantially parallel to said first section, said third section extending to and including said second end, said first section having a first bore extending therethrough;

bracket means having a rectangular body with a first support surface separated from a second support surface by a mounting surface, said mounting surface being offset from said rectangular body to align said first support and said second support with the face of the first section of the lever means, said second support surface having a second bore therein, said mounting surface having a third bore therein; and

fastener means extending through said third bore in the mounting surface and the first bore of the first section of the lever means for holding said first support surface and said second support surface against the face of said frist section of the lever means to locate the second bore at a continuous radius from the pivotal connection of the first end of the lever means.

4,022,082

DRIVING APPARATUS FOR OSCILLATION OF A MOLD WITHIN A CONTINUOUS CASTING MACHINE

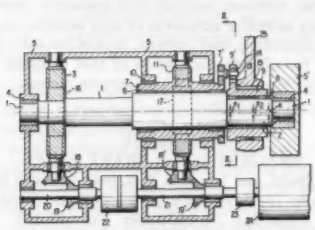
Yoshikazu Uchimoto, Kobe, Japan, assignor to Kobe Steel Ltd., Kobe, Japan

Filed Oct. 14, 1975, Ser. No. 622,445

Claims priority, application Japan, Oct. 14, 1974, 49-118360; Oct. 13, 1974, 49-118361

Int. Cl.² G05G *1/00*

U.S. Cl. 74—570 **3 Claims**



1. A driving apparatus for oscillation of a mold within a continuous casting machine, which comprises:

an eccentric shaft, having an eccentric shaft portion, rotatably mounted upon a frame;

an eccentric sleeve mounted upon said eccentric shaft portion and operatively connected to a mold oscillating system through means of a connecting rod;

a first drive shaft operatively connected to said eccentric shaft;

a second drive shaft operatively connected to said eccentric sleeve;

drive means operatively connected to said first and second drive shafts for continuously driving said first and second drive shafts; and

clutch means interposed between said first and second drive shafts for controlling the rotation of said first and second drive shafts and, in turn, the rotation of said eccentric shaft and said eccentric sleeve at the same rate of revolution when said clutch means is engaged so as to oscillate said connecting rod with a predetermined amplitude or at different rates of revolution when said clutch means is disengaged so as to thereby continuously alter the oscillation amplitude of said connecting rod.

4,022,083

DRIVE SYSTEM FOR CONNECTING TWO DRIVE SHAFTS TO A SINGLE OUTPUT SHAFT, AS IN A PROPELLER DRIVE FOR A WATERCRAFT

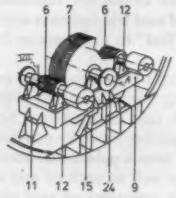
Erich Pollak-Banda, Augsburg, and Erich John, Gersthofen, both of Germany, assignors to Fa. Zahnraederfabrik Renk AG, Augsburg, Germany

Continuation of Ser. No. 450,416, March 12, 1974, abandoned. This application Sept. 30, 1975, Ser. No. 618,060

Claims priority, application Germany, Mar. 14, 1973, 2312626

Int. Cl.² F16H *37/06*

U.S. Cl. 74—665 B **8 Claims**



1. A drive system for connecting a pair of ship engines to a propeller shaft, said system comprising in combination:

a housing formed of a plurality of relatively nonbendable elements forming an assembly having a pair of ends and symmetrical about a vertical plane passing through said ends, and of a plurality of relatively bendable elements;

a support for said assembly at each of said ends thereof in said vertical plane;

a pair of pinions spaced apart in and symmetrical about said vertical plane;

a support for each of said pinions on said nonbendable elements of said housing;

means for securing each of said supports for said pinions in any of a plurality of positions on said nonbendable elements of said housing;

a drive gear supported on said nonbendable elements and symmetrical about said vertical plane, said pinions each meshing with said drive gear;

a pair of horizontal parallel drive shafts each driven by a respective one of said engines and extending perpendicularly to said vertical plane;

a flexible coupling between each of said pinions and a respective one of said drive shafts for transmitting only rotary motion therebetween; and

an output shaft parallel to said drive shafts and connecting said drive gear to said propeller shaft.

4,022,084

CONTROL COUPLINGS

Brian Colin Pagdin, Sutton Coldfield; Oswald Webb, Coventry; Anthony Peter Roylance Rolt, Stratford on Avon, and Frederick James Walker, Banbury, all of England, assignors to GKN Transmissions Limited, Erdington and Harry Ferguson Limited, Moreton-in-Marsh, both of, England

Filed May 9, 1975, Ser. No. 576,233

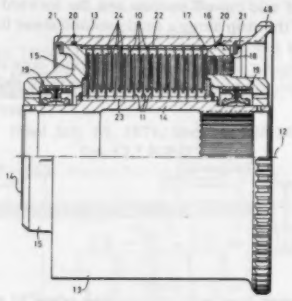
Claims priority, application United Kingdom, May 9, 1974, 20485/74

Int. Cl.² F16H *1/44*; F16D *31/00, 47/00*

U.S. Cl. 74—711 **5 Claims**

1. A control coupling comprising an enclosure, first and second sets of mutually interleaved elements within said enclosure and arranged for rotation about a common axis, a viscous liquid within said enclosure for transmitting torque between the sets of elements by means of viscous shearing of the viscous liquid said first and second sets of elements being arranged for driving connection with first and second rotatable members respectively, the quantity of liquid within said

enclosure and the construction thereof being such that, at a predetermined working temperature of at least 100° C, the pressure of the liquid in the enclosure rises substantially above ambient, at least one set of said elements being free to move



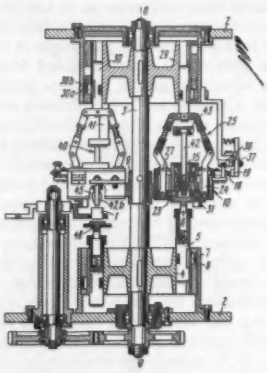
in directions parallel with said common axis, and at least one set of said elements being provided with facings of a friction material for transmitting torque between the sets of elements by means of frictional engagement as in a wet clutch.

4,022,085

ROTOR MACHINE FOR CUTTING-OFF HOLLOW ARTICLES

Viktor Konstantinovich Zhiklenkox, ulitsa 25 sentyabrya, 54, kv. 27; Viktor Mikhailovich Ilin, ulitsa Rumyantseva, 15, kv. 14; July Fedorovich Martynenkov, ulitsa Oktyabrskoi revoljutsii, 7, kv. 92; Nikolai Kuzmich Petukhov, ulitsa V.Profinternovskaya, 32, all of Smolensk, and Nikolai Vasilievich Volkov, ulitsa Fevralskaya, 11, kv. 11, Klimovsk, all of U.S.S.R.

Filed Dec. 8, 1975, Ser. No. 638,316
Int. Cl.² B23B *3/04, 5/14;* **B23D** *21/00*
U.S. Cl. 82—58 **8 Claims**



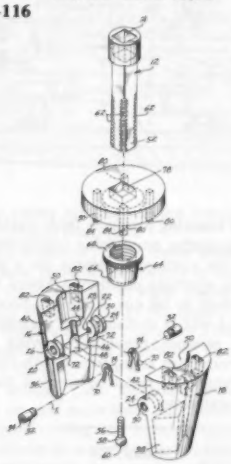
1. A rotor machine for cutting-off hollow articles comprising: a bed; a device for loading parts installed on said bed; a device for cutting-off parts mounted on said bed and being kinematically linked with said device for loading parts, said device for cutting-off parts made in the form of a rotor comprising a shaft installed in said bed and tool units mounted on said shaft, each of said tool units consisting of a hollow holder arranged parallel to the axis of said shaft and having an inner surface which is eccentric relative to its outer surface and means for reversably turning said hollow holder relative to the axis of the outer surface and a cutting tool in the form of a pair of cutters arranged parallel to the axis of said shaft and having means to coaxially align the cutters with each other at the moment in time when the part is introduced in the device for cutting-off parts, one cutter of said pair of cutters being cylindrical in shape with a cutting edge on one of its faces, said cutting edge lying in the same plane as a face of the hollow holder, said cutter being installed in said hollow holder coaxially with its inner surface with a provision for moving said cutter towards the part in a direction parallel to the axis of said shaft by means of a carriage upon which the hollow holder is located, an axle installed upon said carriage, a roller carried on said axle and a master form, connected to said bed, which interacts with said rollers, the other one of said pair of cutters is in the form of a ring and is provided with a cutting edge on the face directed to the face of the first cutter of said pair of cutters, said other one of said pair of cutters having means to provide that its longitudinal axis is coaxial with the axis of the inner surface of the hollow holder at the moment in time when the part is introduced into the device for cutting-off parts, said other one of said pair of cutters being formed by two half-rings and constructed to close radially relative to their axis when clamping the part and for opening when releasing the cut-off part; a means for closing and opening said half-rings radially relative to their axis; a drum installed on said rotor shaft at one side of said tool units; slides mounted in said drum parallel to the axis of said shaft to move the part in a direction parallel to the axis of said shaft; mandrels mounted on each of said slides for receiving the part; a means for reversable turning of each of said hollow holders relative to the axis of its outer surface, said means being mounted in each of said tool units.

4,022,086

ADJUSTABLE SOCKET WRENCH

Merlin G. Ramsey, 25441 104th Apt. 10A, Kent, Wash. 98031

Filed Mar. 24, 1976, Ser. No. 669,894
Int. Cl.² B25B *13/32*
U.S. Cl. 81—116 **4 Claims**



1. An adjustable socket wrench having an axis of rotation and comprising:

a longitudinally divided socket member comprising two socket member halves, and pivot means connecting said socket member halves together at a location intermediate their ends, for pivotal movement about a transverse axis which substantially intersects the axis of rotation of said socket wrench, said socket member halves having complementary wrench jaws extending endwise of said socket member in one direction from said pivot means, and complementary lever portions extending endwise of said socket member in the opposite direction from said pivot means;

means for adjusting the spread of said lever portions to in

that manner pivotally move said socket member halves and change the spread of said wrench jaws;

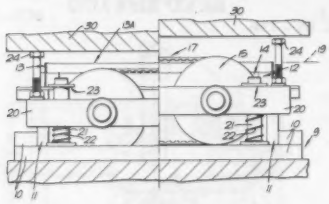
an elongated drive shank connected to said socket member and projecting axially therefrom endwise of the lever portion end of the socket member, said shank having a non-circular exterior cross section extending throughout at least a portion of its length, a drive member having a complementary non-circular opening therein in which the non-circular portion of said drive shank is snugly but slidably received, whereby said drive member is movable in position axially along said shank, a plurality of drive keys secured to said drive member at locations radially offset from said complementary non-circular opening, said drive keys extending axially from said drive member towards the socket member, and wherein each lever portion of the socket part is formed to include at least one key socket positioned to receive a said drive key, wherein said key sockets are elongated in a direction that extends perpendicular to the transverse pivotal axis of said socket member halves, a distance sufficient to permit the drive keys to be received in said key sockets throughout the full range of adjustment of the socket member, and wherein said key sockets are sized to snugly receive said drive keys in the direction extending axially of the pivotal axis.

4,022,087

METHOD OF AND APPARATUS FOR CUTTING SHEET MATERIAL

David S. Queen, and John Mitchell, both of Sanquhar, England, assignors to Sidlaw Industries Limited, Dundee, Great Britain

Filed Mar. 2, 1976, Ser. No. 663,091
Int. Cl.² B26D *7/06*
U.S. Cl. 83—27 **12 Claims**



1. A method of blanking products from pliable sheet material in a cutting apparatus, comprising supporting the material to be cut within the cutting apparatus on a planar support member having an aperture positioned within the peripheral shape of the product to be cut, cutting a product from the supported material with a cutting edge peripherally defining the shape of the product, thereafter moving a drive roller through said aperture into engagement with the cut product, and rotatably driving said roller to remove the cut product from the cutting apparatus.

4,022,088

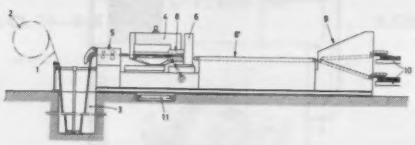
PROCESS AND APPARATUS FOR THE CUTTING OF TRANSFORMER CORE SHEETS

Lothar Stötzel, Buschhuttener Strasse 87, and Dieter Heider, Bottenbacher Strasse 73, both of 5910 Kreuztal-Buschhutten, Germany

Filed Mar. 18, 1976, Ser. No. 668,032
Int. Cl.² B26D *3/24;* **H01F** *7/06*
U.S. Cl. 83—34 **10 Claims**

1. In a process for the cutting of transformer core sheets to be stacked one on top of the other within the yoke and the leg packs of a transformer core with overlapping edges to mortise the yokes and legs together, in which a continuous strip of metal is fed lengthwise to a cutting station in which a swivel-type cutting shear cuts off workpieces in trapezoidal or parallelogram form along shear lines oblique to the length of the strip; the improvement comprising cutting the strip along a first said oblique shear line, turning the cutting shear until it is oppositely obliquely positioned relative to said first shear line, spacing the cut-off portion of the strip from the remainder of the strip in a direction lengthwise of the strip, and cutting off the rear tip of said cut-off portion and the forward tip of said remainder of the strip along a single second shear line perpendicular to the first said shear line.

7. Apparatus for the cutting of transformer core sheets to be stacked one on top of the other within the yoke and leg packs



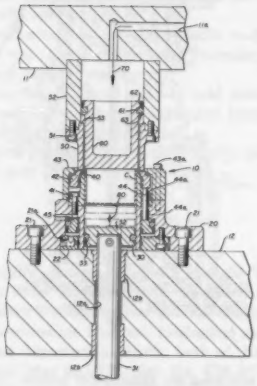
of a transformer core with overlapping edges to mortise the yokes and legs together, comprising in combination means to advance a continuous strip of metal lengthwise toward a cutting station, a swivel-type cutting shear disposed in said cutting station for cutting off pieces of said strip along shear lines that are alternately oppositely obliquely angled relative to the length of the strip, means to advance said cut-off portions further in the direction of movement of said strip, and means to retract the remaining portion of said strip in a direction opposite the direction of advance of said strip.

4,022,089

CONTAINER TRIMMING APPARATUS

Joseph D. Bulso, Jr., and William R. Lewers, both of Canton, Ohio, assignors to Redicon Corporation, Canton, Ohio

Filed Aug. 16, 1976, Ser. No. 714,624
Int. Cl.² B26D *7/18*
U.S. Cl. 83—124 **9 Claims**



1. Apparatus for trimming flanges from containers for use with a press having a base and a movable member comprising:

A. a trim punch secured to said base for receipt of said container;

B. a trim die stripper

1. movably secured to said base, and

2. telescoped over said trim punch and underlying a portion of the flange of said container when the same is received within said trim punch;

C. a pressure pad carried by said movable member of said

press for movement therewith into and out of holding contact with said container; and

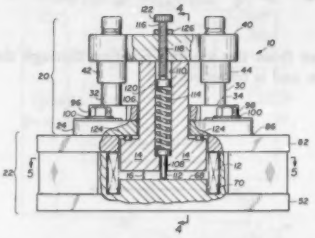
D. a trim die carried by said movable member of said press for movement therewith into and out of trimming engagement with said flange.

4,022,090

ELECTRICALLY ACTUATED PUNCH PRESS

Norman R. Doherty, 870 Main St., Farmingdale, N.Y. 11735, and Richard F. Doherty, 2 Freshman Lane, Stony Brook, N.Y. 11790

Filed July 14, 1976, Ser. No. 705,283
Int. Cl.² B26D *5/08*
U.S. Cl. 83—162 **8 Claims**



1. A compact, portable punch press comprising, in combination, a superposed positioned die set, a stroke-powering unit in supporting position beneath said die set, and connecting means for interconnecting said die set and stroke-powering unit together in a predetermined positional relation to each other; said die set comprising a first connecting plate having at least two locating and movement-guiding pins mounted in upstanding relation therefrom, an anvil having openings and disposed in an operative fixed relation adjacent said first connecting plate with said connecting plate pins projected through said anvil openings, a tool holder fixedly mounted adjacent the upper end of said pins in a clearance position from said anvil and in an operative fixed relation thereto as determined by said pins, and a movement-transmitting member connected in depending relation from said tool holder for urging said tool holder through descending and ascending movements along said pins during functional use of said die set; said stroke-powering unit comprising a base plate, and electrically operational solenoid coil and means mounting said coil in a fixed position on said base plate, and a second connecting plate mounted in covering relation over and in fixed positional relation to said solenoid coil; said connecting means comprising means located at the interface of said first and second connecting plates adapted to interconnect said plates together in a predetermined positional relation, whereby said depending movement-transmitting member is adapted to project within said solenoid coil for electrical reaction therewith due to the respective positional relationship of said depending member and said coil to said first and second connecting plates and said positional relation of said first and second connecting plates to each other.

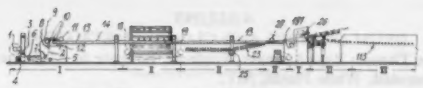
4,022,091

MACHINE FOR DRESSING CONTINUOUS WEB MATERIALS IN STRETCHED CONDITION ON A PLURALITY OF FRAMES

Vito Frigo, Cervignano del Friuli (Udine), Italy, assignor to Ausatuft S.p.A., Udine, Italy

Filed Sept. 3, 1975, Ser. No. 609,923
Claims priority, application Italy, Sept. 17, 1974, 27357/74
Int. Cl.² B26D *5/00*
U.S. Cl. 83—175 **22 Claims**

1. A machine for dressing, in stretched condition, continuous web materials on a plurality of frames, comprising means for moving a continuous web along a given path and means for moving along a second path intersecting said given path at an intersecting zone stripped frames, provided with means for connecting thereto the continuous web after the path intersecting zone, and wherein the means for moving the web along



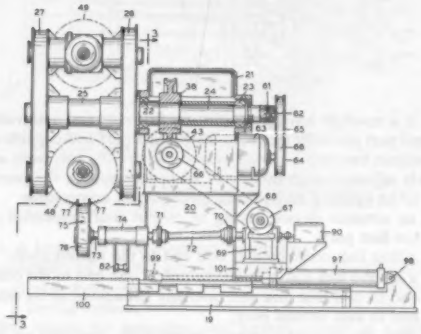
said given path comprise endless pin conveyors having pins for piercing through the web and guides respectively guiding said conveyors and located respectively at opposite sides of the machine, said conveyors carrying the continuous web dressed on said pins at a predetermined tension.

4,022,092

MULTIPLE BLADE SCRAP SAW FOR PIPE MILL

William R. Scheib, Sewickley, Pa., and Ralph M. Shaffer, Jr., Huffman, Tex., assignors to Aetna-Standard Engineering Company, Ellwood City, Pa.

Filed Feb. 25, 1976, Ser. No. 661,371
Int. Cl.² B26D *1/18*
U.S. Cl. 83—306 **14 Claims**



1. A plural rotary saw for on-line cut-off of continuously moving stock, which comprises

a. a normally stationary main frame structure,

b. a saw frame structure journaled in said main frame for rotation about an axis at right angles to and vertically offset from the pass line of the stock,

c. said saw frame structure including a main shaft journaled in the main frame and extending forward therefrom in cantilever fashion,

d. spaced inboard and outboard saw frame housings mounted on said main shaft and rotatable therewith,

e. a plurality of cutting saw units mounted by and between said saw frame housings and individually rotatable about axes spaced equally from and parallel to the axes of said main shaft,

f. said cutting saw units being generally equi-angularly spaced with reference to said main shaft whereby constant speed rotation of said main shaft will move successive cutting saw units into cutting position at generally uniform intervals,

g. each of said cutting units including an individual housing rotatably mounted by said saw frame housings and maintained in a fixed angular orientation with reference to the pass line, and a rotating saw blade journaled in said support housing for rotation about an axis parallel to the pass line, and

h. a common drive means for said cutting units including a common drive shaft coaxial with and journaled within

said main shaft, and means in one of said saw frame housings forming a drive connection between the common drive shaft and the individual cutting units.

4,022,093

DRUM OPENING AND CLOSING MECHANISM

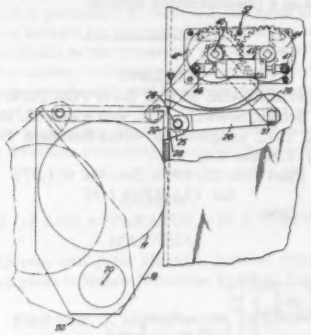
Eric Thomas Ray, Andover, England, assignor to AMF Incorporated, White Plains, N.Y.

Filed Apr. 6, 1976, Ser. No. 674,252

Claims priority, application United Kingdom, Apr. 17, 1975, 15841/75

Int. Cl.² B26D *7/22*

U.S. Cl. 83—355 **6 Claims**



1. In a machine having a stationary first part and a movable second part pivotally mounted on the first part and capable of movement between a closed position where the two parts are closely adjacent each other and an open position, the provision of an opening and closing mechanision comprising:

a. an actuator device having an output shaft, mounted on the first part;

b. a first link connected at one end to the output shaft;

c. a second link pivotally connected at one end to the other end of said first link and pivotally connected at its other end to said second part;

d. first and second elements respectively mounted on the output shaft and the first part, said elements being coupled in such a manner that they are mutually contra-rotatable; and

e. a shock absorber connected between eccentric points on said first and second elements, said shock absorber effecting damping as the distance between said eccentric points decreases in operation.

4,022,094

TRIMMER FOR LUMBER PACKAGES

Ronald Malcolm Hetherington, 450 MacBeth Crescent, Vancouver, British Columbia, Canada (V7T 1V7)

Filed May 19, 1976, Ser. No. 688,103

Int. Cl.² B27B *5/04*

U.S. Cl. 83—409 **11 Claims**

1. A trimmer for a lumber package comprising:

a reciprocating, retaining carriage to receive the lumber package;

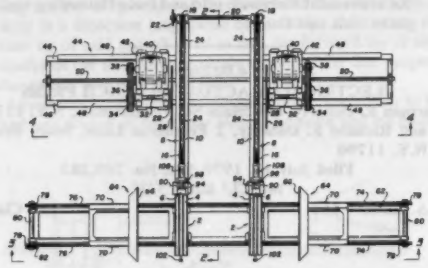
a first track;

means to reciprocate the retaining carriage along the first track from a loading position through a second position;

cutting means on each side of the track at the second position to trim the lumber package;

compressor means reciprocable at the loading position to compress a lumber package in a direction substantially perpendicular to the first track; and

releasable retaining means to hold the lumber package in a predetermined, fixed position on the retaining carriage as



it moves from the loading position through the second position and is trimmed.

4,022,095

PICTURE MAT CUTTER

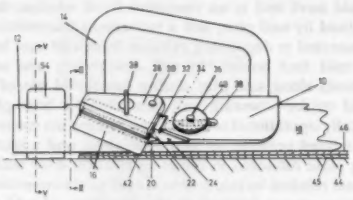
Garnon Anthony Jones, Wymondham, England, assignor to Locality Arts Limited, England

Filed Jan. 6, 1976, Ser. No. 646,891

Claims priority, application United Kingdom, Jan. 22, 1975, 2694/75

Int. Cl.² B26D *3/02*

U.S. Cl. 83—455 **6 Claims**



1. A mount cutter comprising:

a housing;

a guide rail along which the housing is adapted to slide;

a blade fixed to said housing and depending therefrom to make sliding contact with said guide rail over at least a portion of the length of the blade as the housing is slid along said guide rail, said blade being a single edge razor type blade having a sharp edge and a butt edge, and a portion of said blade protruding below said guide rail for engaging in and cutting sheet material located below said guide;

means on said housing for locating said butt edge of said blade;

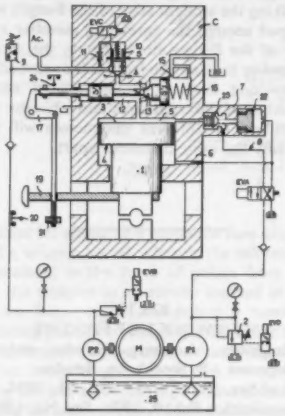
a stop member on said housing adapted to be engaged by the rear lower end of said blade to prevent said blade from sliding in a downward and rearward direction due to forces arising from friction between said blade and said sheet material during cutting thereof; and

means for adjusting the position of said stop member to control the amount by which the lowermost corner of the cutting edge of said blade extends below said housing for adjusting the depth of the cut.

4,022,096
HYDRAULIC PRESSES, NOTABLY FOR SHEARING AND CUTTING MATERIALS

Gaston Sebastien Forichon, Alfortville, France, assignor to Societe des Anciens Ateliers H. Jambon, France

Filed Aug. 30, 1976, Ser. No. 718,536
Claims priority, application France, Sept. 10, 1975, 75.27694
Int. Cl.² B26D 5/12; B30B 1/32
U.S. Cl. 83—617 5 Claims

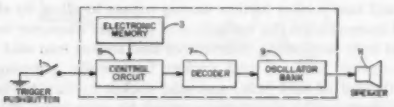


1. In a hydraulic press for performing shearing or cutting operations, of the type comprising a press piston mounted for reciprocating motion in opposite directions in a hydraulic space divided into one chamber for the piston operating at the working pressure and another chamber for the return stroke of said piston, a reservoir for the working fluid, and a pressure-fluid accumulator for supplying fluid to the piston working chamber, the piston rod being rigid with a slide arm adapted to slide along a linkage terminating at one end with an adjustment nut, the accumulator communicates with the working chamber of the piston via a hydraulic circuit comprising essentially a normally closed spring-loaded valve and a chamber in which a spool valve is adapted to move transversely to the piston axis, said spool valve having a stem extension projecting axially outside the press control device, the outer end of this spool valve stem engaging one arm of a bell-crank lever fulcrumed to a fixed pivot pin and having its other arm rigid with said linkage.

4,022,097
COMPUTER-AIDED MUSICAL APPARATUS AND METHOD

Christopher E. Strangio, 43 Bailey Road, Watertown, Mass. 02172

Filed July 15, 1974, Ser. No. 488,821
Int. Cl.² G10B 3/10; G10H 5/02
U.S. Cl. 84—1.03 20 Claims

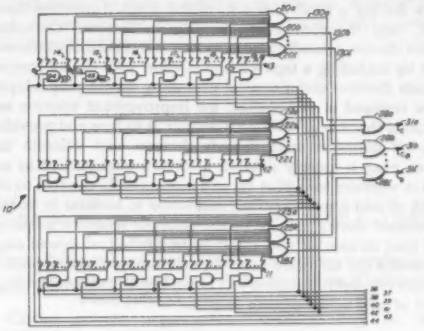


1. A method of electronically aided musical performing, that comprises, electronically storing coded data corresponding to successive musical notes in a musical composition; successively triggering by a human performer the controlled release of successive coded data from said storing in accordance with the rhythm of such composition; upon said release, generating from the successive data, oscillations corresponding in frequency to the corresponding musical notes; and converting said oscillations into the corresponding audible tones of the notes of the composition.

4,022,098
KEYBOARD SWITCH DETECT AND ASSIGNOR

Ralph Deutsch, and Leslie J. Deutsch, both of 3647 Scadlock Lane, Sherman Oaks, Calif. 91403

Filed Oct. 6, 1975, Ser. No. 619,615
Int. Cl.² G10F 1/00
U.S. Cl. 84—1.03 22 Claims



1. A keyboard switch system comprising:

a plurality of switches arranged in groups, a plurality of said groups comprising a set, a plurality of said sets comprising a keying system,

first means for operating said keying system in a search mode,

detection means responsive to said first means for detecting a change of switch states in said groups,

second means responsive to said detection means for operating said keying system in an assign mode,

identifying means responsive to said second means for generating signals identifying switches in said groups detected by said detection means to have changed state and whereby identification data is created,

assignment memory means for storing said identification data to be thereafter read out,

assignor means including means responsive to said identifying means for transferring said identification data corresponding to a switch in new closed state detected by said detection means into said assignment memory means, said means responsive to said detection means for clearing identification data from said assignment memory means corresponding to a switch in new open state detected by said identification means, and whereby identification data corresponding to switch in new closed state is not read into said assignment memory means when all assignment words are assigned.

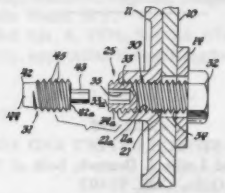
signal generation means whereby a full signal is created when all said assignment words are assigned, and

third means responsive to said assignor means whereby said keying system is caused to terminate operation in said assign mode and to return to said search mode when said identification data is cleared or stored for all switches detected as having changed state.

4,022,099
THREADED FASTENER WITH REUSABLE THREAD FORMING PILOT TIP

David B. Ballantyne, Southfield, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 6, 1976, Ser. No. 655,725
Int. Cl.² F16B 35/00
U.S. Cl. 85—1 P 3 Claims

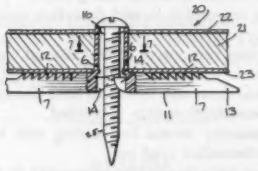


1. In a two-piece self-tapping threaded fastener of the type having a screw and a separate thread forming pilot tip, said screw having a head and a threaded shank extending therefrom, said threaded shank having an internal wrenching socket therein extending from its free end, said thread forming pilot tip including a tapered end portion with thread forming threads thereon and a coaxial extending driven plug adapted to be engaged in said socket, the improvement wherein said threaded shank is of reduced diameter at its free end providing reduced diameter lead threads thereon and wherein said driven plug is loosely slidable in driven engagement in said socket whereby said pilot tip can move axially relative to said shank of said screw to permit said screw to hesitate in its axial movement during driving of the fastener whereby to permit said lead threads of said shank to attain helical thread alignment with the threads formed by said thread forming pilot tip in a previously unthreaded nut blank before threaded engagement of said screw therein begins.

4,022,100
FASTENER

Kenneth C. Johnson, 17 Wellington Drive, Stony Brook, N.Y. 11790

Filed Aug. 13, 1975, Ser. No. 604,443
Int. Cl.² F16B 13/04
U.S. Cl. 85—83 5 Claims

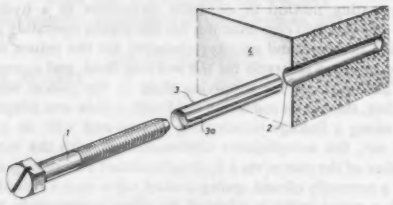


1. A fastener comprising a body portion having an opening therethrough having an axis, an upper surface and a lower surface, the lower surface of the body portion having a pair of opposed outer corners, a gripping leg extending from each of the opposed outer corners, each gripping leg comprising an outer corner and an upper surface extending substantially perpendicular relative to said axis adapted to underlie and abut the lower surface of said body portion, the upper surface of each leg having side corners substantially normal to said outer corner, the outer corner of said gripping leg being integral with and pivotally mounted to said lower surface of said body portion whereby insertion of a threaded spreading member through the opening in the body portion will cause said legs to spread apart to permit the legs to grip a wall, means in said opening to permit spreading members of different sizes to be inserted therein, said means comprising a plurality of resilient ribs in said opening substantially parallel to each other, a resilient striking flange extending upwardly from and centrally located on the upper surface of each leg, each striking flange being a thin flange equidistantly spaced inwardly from each side corner, each of said flanges having flat sides at right angles to the said upper surface, each of said flanges having a first straight edge at right angle to the upper surface and a second edge adjacent said first edge extending upwardly and inwardly connecting the first edge with the upper surface, upon insertion said spreading member initially striking the said second edge of the flanges to move the legs outwardly and thereafter striking the straight edge of the flanges with the said flanges wrapped around the spreading member and the said straight edge of the flanges hooked onto the threads of the spreading member to keep the legs in their spread apart position, whereby said fastener is adapted to accommodate threaded member of different sizes and whereby insertion of threaded members of different thicknesses will spread said legs substantially the same distances apart.

4,022,101
SCREW-SOCKET FIXTURE

Claes Ivar Helgesson, Akersberga, Sweden, assignor to Arbman Development AB, Stockholm, Sweden

Continuation of Ser. No. 519,711, Oct. 31, 1974, abandoned.
This application Feb. 9, 1976, Ser. No. 656,465
Int. Cl.² F16B 13/06
U.S. Cl. 85—85 2 Claims

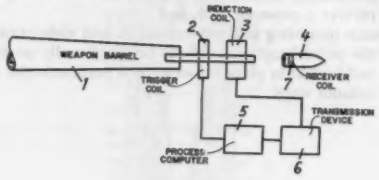


1. An anchoring assembly for anchoring a machine screw in brickwork, concrete or stone, said anchoring assembly comprising in combination a machine screw having an enlarged head and a threaded shank of predetermined crest diameter, a workpiece of brickwork, concrete or stone having a smooth wall hole therein, and a generally cylindrical socket within said hole, said screw threadably carried within said cylindrical socket, said hole diameter being larger than the crest diameter of the screw but no larger than 1.1 times that crest diameter, said cylindrical socket having an initially smooth interior and exterior walls, said socket being formed of a material capable of plastic deformation beyond its yield point upon screw insertion, said socket having a wall thickness between 3% and 7% of the crest diameter of the screw, and having an initially outer diameter in a relaxed state in excess of the diameter of said hole and said socket further having means to allow by elastic radial compression the reduction of its outer diameter to that of said hole facilitating insertion of said socket into said hole, the exterior wall of said socket frictionally gripping the smooth wall of said hole, and said socket further having an inner diameter as insertably carried by said hole which is smaller than the crest diameter of said screw, the entire wall of said socket being plastically deformed beyond its yield point as a result of said screw being threaded thereinto and filling at least one half the volume between the screw threads and the wall of the hole so as to provide a high retention force acting on the screw and therebetween the smooth wall socket and the smooth wall hole.

4,022,102
METHOD AND APPARATUS FOR ADJUSTING A FUZE AFTER FIRING A PROJECTILE FROM A WEAPON

Godwin Ettel, Zurich, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Feb. 23, 1976, Ser. No. 660,791
Claims priority, application Switzerland, Mar. 10, 1975, 2978/75
Int. Cl.² F42C 17/00
U.S. Cl. 89—6.5 8 Claims

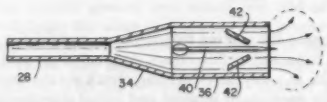


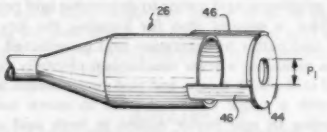
1. A method for adjusting a projectile fuze after having been fired out of a weapon barrel, wherein the information is inductively transmitted in the form of pulses from a transmitter secured to the weapon to a receiver located in the projectile fuze, and the frequency of the pulses is tuned to the time available during passage of the projectile at the transmitter, so that all information can be transmitted within this time, the improvement comprising the steps of:
1. passing the projectile through a first element;
2. initiating the transmission of information upon passage of the projectile through the first element;
3. after such passage first calculating the information and storing the same;
4. passing the projectile through a second element; and
5. upon passage of the projectile through the second element transmitting the information in the form of pulses to the receiver.

4,022,103
GAS DYNAMIC SABOT STRIPPER

Edward M. Schmidt, Forest Hill,, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 12, 1975, Ser. No. 612,886
Int. Cl.² F41C 21/18
U.S. Cl. 89—14 SB 8 Claims





1. A muzzle gas dynamic sabot stripper for increasing the muzzle gas dynamic forces on the rear surfaces of a sabot following the exit of said sabot from the muzzle bore of a weapon to which said stripper is attached in order to laterally separate sabot components from a projectile, said stripper comprising:

a gas restricting chamber of first length having a uniform cross-section along its length of a second diameter greater than the diameter of said bore for limiting muzzle gas expansion and directing the muzzle gas axially to increase the dynamic load on the rear of said sabot;

transition chamber means of a second length shorter than said first length connecting one end of said gas restricting chamber to said bore, said transition chamber having a cross-section progressively varying along its length from a diameter at least as large as said bore diameter to a diameter equal to said second diameter for providing a smooth flow transition between said bore and said gas restricting chamber, the other end of said gas restricting chamber being open and of said second diameter;

a deflector having a central aperture coaxial with said bore, said deflector extending across said gas restricting chamber's cross-section to reduce the velocity of said sabot components laterally separated from said projectile; and

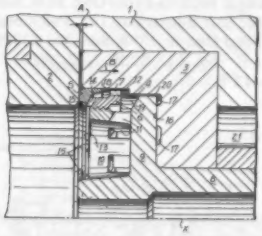
connecting means connecting said deflector to said gas restricting chamber to support said deflector spaced from the open end of said restricting chamber and to provide muzzle gas flow through said restricting chamber unrestricted by said deflector;

said gas restricting chamber being of sufficient length and diameter to strip a sabot by muzzle gas dynamic forces within said gas restricting chamber without scoring or rotational forces.

4,022,104
BREECHBLOCK SEALING FOR LARGE-CALIBER BARRELED WEAPONS

Anton Politzer, Lauf, and Wilhelm Machmer, Nurnberg, both of Germany, assignors to DIEHL, Nurnberg, Germany

Filed July 23, 1975, Ser. No. 600,910
Claims priority, application Germany, July 24, 1974, 2435520
Int. Cl.² F41F 11/02
U.S. Cl. 89—26 5 Claims



1. In a ring closure arrangement for the breechblocks of large-caliber barreled weapons; including a closure seal ring having an L-shaped cross-section in a longitudinal axial section thereof, said seal ring being prestressed at a closed breechblock position for sealing the end of the barrel against said breechblock, the improvement comprising: a recess formed in said breechblock, said seal ring being axially displaceable within said recess; actuating means in said breechblock for imparting axial movement to and pressing said seal ring against the end of said barrel guide grooves in said recess; an intermediate spacer ring having projections slidable along said guide grooves in said recess of said breechblock and adapted to contact said seal ring responsive to operation of said actuating means; said intermediate spacer ring comprising a threaded nut; a rotary member having a collar-shaped drive shaft for actuating said intermediate spacer ring; said rotary member having a flange contacting a bottom supporting surface on said breechblock.

4,022,105

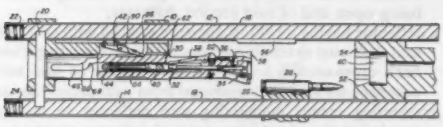
AUTOMATIC WEAPON FIRING MECHANISM

Doyle L. White, Davenport, Iowa, assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 610,024, Sept. 3, 1975, Pat. No. 3,999,461. This application Sept. 27, 1976, Ser. No. 726,884

Int. Cl.² F41D *3/06, 11/16*

U.S. Cl. 89—149 8 Claims



1. An automatic weapon firing mechanism comprising:
- a bolt carrier slideably movable between recoil and battery positions, said carrier being spring driven to battery position and returnable to recoil position by gases from a previously fired cartridge,
- a bolt movable rotatably and longitudinally on said carrier, said bolt having a cam pin,
- said carrier having a cam slot receiving said pin whereby relative longitudinal movement between said bolt and carrier causes rotational movement of said bolt,
- a firing pin mounted for longitudinal movement on said bolt,
- spring means urging said firing pin forwardly on said bolt,
- a firing pin sear mounted on said bolt and adapted to releasably retain said firing pin in a cocked position in opposition to said spring means,
- a firing pin cocking pin on said firing pin,
- said carrier having cam slots receiving said cocking pin whereby rearward movement of said carrier returns said firing pin to cocked position.

4,022,106

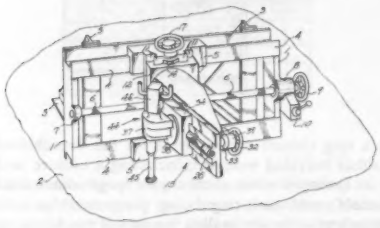
PORTABLE MULTI-PURPOSE MACHINE TOOL

Walter A. Kile, Star Route, Box 142, Fall Creek, Oreg. 97438

Filed Dec. 5, 1975, Ser. No. 637,846

Int. Cl.² B23C *1/12, 1/20*

U.S. Cl. 90—12 R 2 Claims



1. A multi-purpose machine tool for attachment to a work piece at a work site, said machine tool comprising in combination,
- a bed adapted for temporary attachment to a horizontal or inclined work piece surface and including ways and a feed arrangement,
- angular bracket means for attachment to said bed and to the work piece,
- a carriage also including ways and a feed arrangement and disposed transversely of said bed in sliding engagement with the bed ways for travel therealong, and
- a column assembly comprising,
- column slide means entrained on the carriage ways and positioned by the carriage feed,
- a column supported at one end by said slide means and including ways formed therealong,
- cooperating means on said column slide means and said one end of the column permitting rotational movement of the column about its major axis and subsequent locking of same against rotational movement,
- a column feed,
- a slide entrained on the column ways and positioned therealong by the column feed,
- a powerhead assembly carried by said slide adapted to receive a powered tool, and
- means mounting said powerhead to said slide permitting the powerhead assembly to be rotationally positioned and locked in place about an axis perpendicular to the column ways.

4,022,107

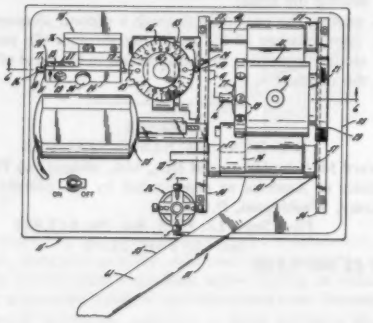
TUBULAR KEY CUTTING MACHINE

Morris Falk, Palm Springs, Calif., assignor to Fort Lock Corporation, River Grove, Ill.

Filed Jan. 8, 1976, Ser. No. 647,332

Int. Cl.² B23C *1/16, 1/00*

U.S. Cl. 90—13.05 15 Claims



1. A machine for making tubular keys, comprising, in combination, a base, key cutter means connected on said base for cutting a bite in a key, key-carrying chuck means mounted on said base for movement in axial and radial directions relative to said cutter for the latter to cut a bite in the key to a preselected axial length and radial depth, a first stop for locating the key axially relative to said cutter to determine said preselected length of bite, a second stop for locating the key radially relative to said cutter to determine said preselected depth of bite, means including a lever mechanism pivotally connected with one of said chuck means and said cutter means and being operable with a single stroke thereof to move said chuck means relative to said cutter means in both said axial and radial directions for the key to engage with said cutter so a bite may be cut in the key to said preselected axial length and radial depth, said lever mechanism means having yieldable holding means directing solely axial relative movement between said chuck means and said cutter means upon rotation of the lever until restrained by said first stop and thereafter yielding by said holding means causes radial movement between said chuck means and said cutter means until engagement of said second stop upon continued rotation of the lever.

4,022,108

HYDRAULICALLY OPERATED PERCUSSION DEVICE

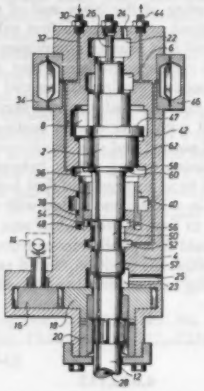
Vaino Esko Juvonen, Klaukkala, Finland, assignor to Linden-Alimak AB, Skelleftea, Sweden

Filed Apr. 16, 1975, Ser. No. 568,686

Claims priority, application Finland, Apr. 20, 1974, 1193/74

Int. Cl.² F01B 7/18; F01L 25/06

U.S. Cl. 91—276 4 Claims



1. In a hydraulically operated percussion apparatus comprising a housing having a bore in which an impact piston is reciprocatingly movable for transferring impact energy to an impact tool, pressure chambers defined between said housing and said piston, and a channel system including a high pressure branch and a low pressure branch for conducting hydraulic pressure fluid to and from the pressure chambers, a first one of said chambers in a ringlike manner surrounding said piston and being defined, at its end remote from the impact tool, by an annular shoulder on said piston, and at its opposite end, by an annular surface of said housing, first and second port means, opening into said first chamber and communicating respectively with said high pressure branch and low pressure branch, said second port means being located between said first port means and said annular surface of said housing, a sleeve shaped distribution valve member surrounding said piston in said first chamber being reciprocatingly movable in response to the reciprocating movement of the piston for alternately covering and uncovering said first and second ports, the improvement that said annular surface of said housing has an annular groove into which one end of said valve member slidingly fits when said second port is covered by said valve member, third and fourth port means in the surface of said bore below said annular surface, said third port means communicating with the bottom of said annular groove and said fourth port means communicating with said low pressure branch, said piston having a mantle surface having recess means therein located to connect said third and fourth port means to each other when the piston is in its end position contacting the tool, and to connect said third port means with said annular chamber when the piston is in a position between its extreme end positions.

4,022,109

AUTOMATIC DIRECTIONAL CONTROL VALVE

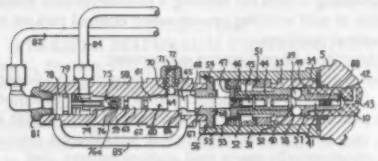
Verne P. Donner, Palatine, Ill., assignor to Deltrol Corporation, Bellwood, Ill.

Continuation of Ser. No. 173,454, Aug. 20, 1971, abandoned. This application Oct. 1, 1975, Ser. No. 618,569

Int. Cl.² F15B 11/15; F01L 25/04

U.S. Cl. 91—356 10 Claims

1. In a control system for a fluid power operated device, the combination of, valve means arranged to control application of fluid pressure to said device, said valve means having a first control position and a second control position, said positions having different effects on the fluid power operated device, means for causing movement of the valve means from its first position to its second position, and fluid pressure actuated means responsive to a pressure change when the valve means is in its second position for driving the valve means from said



second position, said last named means comprising a fluid pressure operated motor arranged to apply the motive force for moving the valve means, yieldable detent means restraining initial movement of the pressure operated motor for preventing movement of the motor until a predetermined pressure is attained, said yieldable detent means being constructed and arranged to reduce its restraining force after yielding.

4,022,110

HYDRAULIC PRESSURE-REGULATING SYSTEM

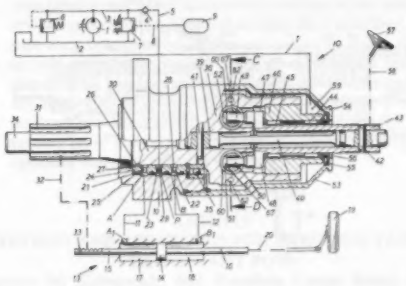
Günther Strauff, Kaarst, Germany, assignor to Langen & Co., Dusseldorf, Germany

Filed Dec. 15, 1975, Ser. No. 640,905

Claims priority, application Germany, Dec. 21, 1974, 2460877; Feb. 26, 1975, 2508367

Int. Cl.² F15B 9/10

U.S. Cl. 91—371 8 Claims



1. In a hydraulic pressure-regulating system for directional control of a dual-functioning servo motor having oppositely arranged working spaces, especially for servo steering motor vehicles, comprising

a pressure fluid source;

a pressure reservoir;

an interconnecting means for enabling flow of fluid around the system; and

a control valve device interposed between said source, said reservoir, and said servo motor having two piston bores comprising

a power input member having two fingers;

a power output member operatively associated with said servo motor;

a housing enclosing said device;

two control pistons within said bores connected by said interconnecting means between said souce, said reservoir, and said servo motor, each control piston being associated with one working space of said servo motor, each control piston having control edges, a reaction area

and a cavity, said control edges controlling the flow of fluid to and from said working spaces, each of said fingers of said power input member engaging one cavity of one control piston to manually move the control pistons upon a relative movement of said power input member;

an elastic resilient connecting means for directly connecting said power input member and said power output member; and

a stabilizing means for holding a predetermined initial pressure in said working spaces when control pistons are in a neutral position;

the inventive improvement comprising:

the sizing of said cavities in relation to said fingers such that there exists, in the neutral position of said control pistons, a gap allowing free play of said fingers in both operational directions before said fingers contact and mechanically move said control pistons, and

said stabilizing means comprising a plate member fixed to said output member and springs interposed between said plate member and said control pistons, said springs balance the force exerted by the initial pressure upon said reaction areas of said control pistons.

4,022,111

VALVE ASSEMBLIES FOR VEHICLE HYDRAULIC BRAKING SYSTEMS

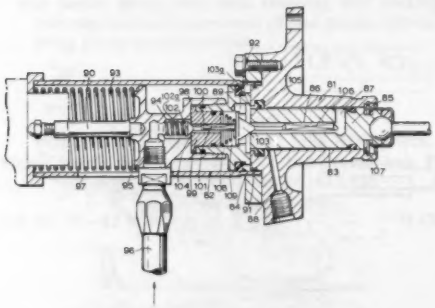
Philip Augustus Taft, Solihull, England, assignor to Girling Limited, Birmingham, England

Division of Ser. No. 464,302, April 26, 1974, Pat. No. 3,957,074. This application Oct. 31, 1975, Ser. No. 627,749

Claims priority, application United Kingdom, May 2, 1973, 20948/73

Int. Cl.² F15B 9/10

U.S. Cl. 91—372 **3 Claims**



1. An hydraulic power-operated booster for a vehicle braking system comprising a cylinder body having a longitudinally extending piston bore, a first positively actuated piston responsive to an applying force and working in said piston bore, said first piston being movable between a retracted position and an operative advanced position, a second floating piston working in said piston bore in a position in advance of said first piston, a pressure space for hydraulic fluid under pressure defined in said piston bore between said pistons, a first valve controlling communication between a port for connection to a reservoir for hydraulic fluid and said pressure space, said first valve being movable between a normally open position and a closed position in response to movement of said first piston away from said retracted position, a second valve controlling communication between said pressure space and a passage for connection to a source of hydraulic fluid under pressure, said second valve being movable between a normally closed position and an open position in response to movement of said first piston away from said retracted position but subsequent to movement of said first valve into said closed position, said second piston being provided with a longitudinal valve bore, and a valve-operating member common to both said valves and guided to slide in and extending through said valve bore, said valve-operating member having a first end adjacent to said first piston and a second end at the end of said second piston remote from said first piston, and said valve-operating member being so constructed and arranged that said second valve is returned to said closed position and said first is subsequently moved into said open position when said first piston is returned to said inoperative position in response to pressure remaining in said pressure space, wherein said first valve comprises a first seating of the inner end of said first piston adjacent to said second piston, and a first valve member for engagement with said first seating comprising a first head at said first end of said valve-operating member, and said second valve comprises a second seating at the end of said second piston remote from said first piston, and a second valve member for engagement with said second seating comprising a second head at said second end of said valve-operating member, a first compression spring acting between said second piston and said first head to urge said first head towards said first seating, a stop in said second piston with which said first head is engageable to limit movement of said first head with said first piston as said first piston moves from said advanced position into said retracted position, and a second compression spring for urging said second head towards said second seating.

4,022,112

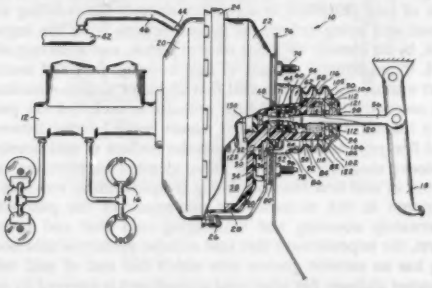
FLOW THROUGH CAP FOR ATTENUATING ANY NOISE CAUSED BY AIR FLOW IN A PNEUMATIC SERVOMOTOR

James B. Putt, and Harold H. Welsh, Jr., both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Dec. 15, 1975, Ser. No. 640,363

Int. Cl.² F15B 9/10

U.S. Cl. 91—376 R **8 Claims**



1. In a servomotor having a first shell joined to a second shell to form a closed chamber therein, the closed chamber being separated by a wall means to form a front chamber and a rear chamber, the wall means having a hub means with a cylindrical body which extends through an axial opening in the second shell, said cylindrical body having an axial passageway therethrough for communicating the front chamber with the rear chamber and the rear chamber with the atmosphere, said axial passageway retaining a control valve means for regulating the communication of air into the rear chamber in response to movement of a control rod by an operator for developing a pressure differential with vacuum in the front chamber to produce an output force, muffler means for attenuating the noise created as a result of air flowing into said axial passageway from the atmosphere, said muffler means comprising:

retainer means connected to said second shell and surrounding said axial opening, said retainer means having a plurality of ribs which engage said second shell to allow air to be presented to the peripheral surface of said cylindrical body;

boot means having a sleeve section which surrounds the

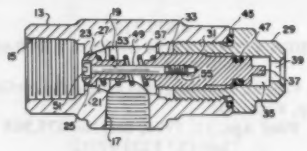
cylindrical body and a closed end section, said sleeve section having a bead on the end thereof for engaging said retainer means, said closed end section having a lip on the end thereof for engaging the control rod, said boot means establishing a flow path along the peripheral surface of said cylindrical body;

cap means having a tubular member with a first shoulder thereon for engaging the cylindrical body and a second shoulder thereon for holding said closed end section of the boot means away from said axial passageway, said tubular member having a plurality of radial openings located between the first shoulder and the second shoulder to establish a fixed cross-sectional area for the flow path to assure that the air present along the peripheral surface can be freely communicated to said axial passageway; and acoustical barrier means located between said second shoulder and said closed end section of the boot means for absorbing noise caused by air inflowing to the control valve means by way of said radial openings in the cap means and the axial passageway.

4,022,113
FLOW CONTROL VALVE

Leland F. Blatt, 31915 Groesbeck Highway, Fraser, Mich. 48026

Filed Dec. 10, 1975, Ser. No. 639,395
Int. Cl.² F15B *13/042*; F15D *1/00*
U.S. Cl. 91—443 **3 Claims**



1. In combination, a double acting cylinder assembly including a reciprocal piston and a piston rod projecting from said cylinder, and a pair of cylinder ports adapted to respectively receive and exhaust pressure fluid for controlling reciprocal movements of said piston rod;

a flow restrictor mounted upon each cylinder port, each flow restrictor comprising a body having a longitudinal bore therethrough, at one end terminating in a first port, and intermediate its ends a second port receiving and connected to a cylinder port;

said body having an apertured seat in said bore intermediate said ports and communicating with said first port;

an annular restrictor element in said bore adapted for spaced registry with and adjustment away from said seat;

an apertured end cap with an enclosed chamber threaded into the other end of the body and sealed therein;

a manually adjustable control pin including manual adjustment means rotatably threaded into and nested and sealed within said chamber of said cap for relative longitudinal movements therein with the manual adjustment means being confined within said enclosed chamber;

a headed pin retainingly engaging and extending through said restrictor element and at one end secured to said control pin;

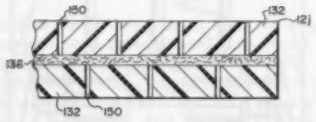
and spring means between said restrictor element and control pin biasing said restrictor element towards said seat;

said control pin being selectively rotatable within said end cap for variably spacing said restrictor element from said seat; and for variably restricting return flow of pressure fluid from said second port to said first port, controlling the speed of movement of said piston and rod within said cylinder; whereby variably delivering pressure fluid to the first port of one restrictor, there is an unrestricted flow of said pressure fluid through said second port into one end of the cylinder, the exhaust from the other end of said cylinder passing through the other cylinder port and into the second port of the other flow restrictor for restricting flow around the restrictor element and through the seat of said second flow restrictor, the second port extending at right angles to the body for mounting upon the corresponding cylinder port, with the respective end caps arranged outwardly and in alignment to facilitate access to said control pins for adjustment thereof.

4,022,114
FLEXIBLE DIAPHRAGM CONSTRUCTION

Charles C. Hansen, III, Hinsdale; John D. Nilles, Roselle, and Olaf E. Kivioja, Villa Park, all of Ill., assignors to Refrigerating Specialties Company, Broadview, Ill.

Continuation-in-part of Ser. No. 485,784, July 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 279,538, Aug. 10, 1972, abandoned. This application Jan. 15, 1976, Ser. No. 649,338
Int. Cl.² F01B *19/00*; F16J *3/02*
U.S. Cl. 92—98 R **9 Claims**



1. A flexible diaphragm for use in a pressurized system within a valve chamber and dividing said chamber into a low pressure side and a variable high pressure side, comprising:

a first sealing layer of a flexible elastomeric material that is readily stretchable under low stress to twice its length and capable of return to its original size upon release of this stress disposed on the high pressure side of the diaphragm;

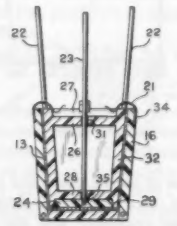
a reinforcing layer of porous fabric material substantially coextensive with said elastomeric sealing layer, said layers being bonded to each other over their interface juncture area between the layers;

a second stretchable sealing layer of elastomeric material disposed on the low pressure side of the diaphragm having a plurality of spaced normally closed minute pinprick perforations therethrough extending through the reinforcing layer at said interface for equalizing pressures on opposite sides of said second layer.

4,022,115
METHOD AND APPARATUS FOR ERECTING PAPER TRANSPLANT POTS

Warren W. Greenwich, 601 Ferndale Congo Road, Little Rock, Ark. 72204

Filed May 10, 1976, Ser. No. 685,197
Int. Cl.² B31B *1/28*
U.S. Cl. 93—49 R **8 Claims**



1. In apparatus for erecting a paper sheet to form a transplant pot, said apparatus including a pyramidal core in the shape of the frustum of an inverted square pyramid and a base

member including a generally square underlying base plate having outwardly directed hinged side panels swingably movable to interfacially engage the sloping sides of said pyramidal core, the improvement comprising:

the interposition of a detachable inverted four-legged drying stand between said core and said base.

4,022,116

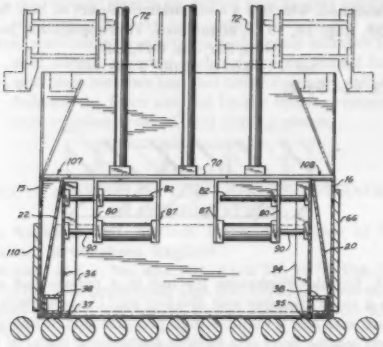
METHOD AND APPARATUS FOR FOLDING BOX FLAPS

Robert H. Frappier, Southwick, Mass., assignor to International Paper Company, New York, N.Y.

Filed July 14, 1975, Ser. No. 595,863

Int. Cl.² B31B *9/26*

U.S. Cl. 93—51 M **14 Claims**



1. The process of folding into a box a pair of flaps which extend upwardly from opposite side walls of said box, said process comprising:

a. applying to the outer surface of each of said flaps a substantially horizontal, inwardly directed force;

b. applying to the outer surface of each of said flaps a substantially vertical downwardly directed force; and

c. applying to the surface of each of said flaps a substantially, outwardly directed force after the application of said substantially vertically directed force.

4,022,117

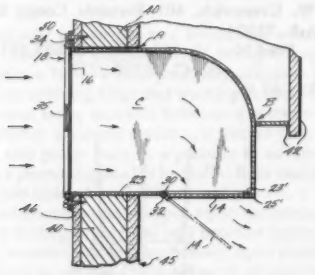
PRESSURE STABILIZING ASSEMBLY

Robert J. Mallian, 824 Swan, Springfield, Mo. 65807

Filed Mar. 12, 1975, Ser. No. 557,782

Int. Cl.² F24F *7/00, 13/00*

U.S. Cl. 98—42 R **5 Claims**



1. A combination of an enclosure and a pressure stabilizing assembly for use in the enclosure for generally equalizing the pressure within the enclosure and the atmosphere during rapidly developing low pressure atmospheric conditions, said enclosure having an enclosure wall for the mounting of the assembly and an eave, and said assembly comprising

a. a chamber defining means, said means including two side wall members, a top wall member, a bottom wall member, and first and second end wall members, portions of said side wall members, said top wall member, and said bottom wall member being for receipt within the wall of the enclosure, and portions thereof extending outwardly from the enclosure wall to the exterior of the enclosure and within an opening in said eave,

b. said first end wall member being solid and rigid and for location exteriorly of said enclosure,

c. said second end wall member for terminating said chamber means within the enclosure, and said second end wall member comprising means for allowing the flow of air between the chamber and the interior of the enclosure, said second end wall member including a continuous grid wire screen,

d. means defining an opening in a portion of the bottom wall member for location exteriorly of the enclosure, and exteriorly of said eave,

e. a plate for normally covering said opening in said bottom wall member,

f. means for pivotally mounting said plate for movement between a first position wherein said plate closes off said bottom wall member opening, and a second position wherein said plate allows the passage of air from the interior of the chamber to the exterior of the enclosure,

g. means for biasing said plate into said first position, said plate being movable from said first position only against the bias of said biasing means.

4,022,118

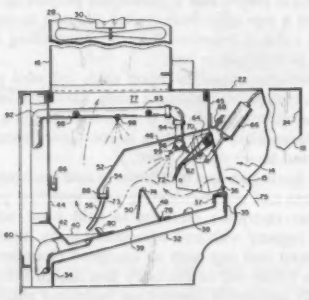
KITCHEN VENTILATOR GREASE EXTRACTOR CONSTRUCTION

Edward B. Vandas, St. Louis, Mo., assignor to McGraw-Edison Company, Elgin, Ill.

Filed Apr. 12, 1976, Ser. No. 675,965

Int. Cl.² F23J *11/12*

U.S. Cl. 98—115 K **7 Claims**



1. In a kitchen venting system having an exhaust duct and power fan means therein for discharging kitchen fumes to atmosphere outside the kitchen, the combination of improved grease extraction means in series air flow connection with the exhaust duct, comprising opposing bottom and top walls and spaced interconnecting side walls therebetween defining a vertically disposed inlet open to the kitchen, said bottom wall being pitched downwardly at approximately 10° – 20° from the horizontal and rearwardly away from said inlet and a rear wall upstanding vertically from the rear end of the bottom wall, a drain in the bottom wall adjacent the rear wall, a first baffle upstanding from the bottom wall approximately midway between the inlet and the rear wall, a second baffle downstanding from the top wall approximately midway between the first baffle and the rear wall, a damper hinged adjacent the top wall for movement between a closed position across the inlet and an opened position angled downwardly and rearwardly from the top wall, the lower end of the opened damper being ap-

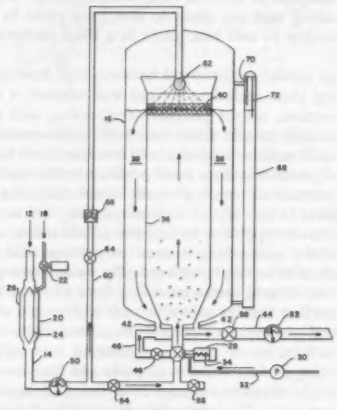
proximately midway between the inlet and the first baffle and further the lower ends of the opened damper and the second baffle defining a plane extended generally parallel to the bottom wall and approximately midway through the inlet and wherein the first baffle extends at least to but at most only slightly beyond said plane, whereby a tortuous flow path is defined rearwardly from the inlet having up and down girations until being directed vertically upwardly along the rear wall for discharge through the exhaust duct, and a fin upstanding from the bottom wall at a location generally vertically below the second baffle, thereby constructing the flow path at this location and further directing liquid droplets of collected grease toward the drain.

4,022,119

LIQUID CARBON DIOXIDE CARBONATION APPARATUS

Fred A. Karr, Redwood City, Calif., assignor to Shasta Beverages Division of Consolidated Food Corporation, Hayward, Calif.

Filed Dec. 22, 1975, Ser. No. 643,096
Int. Cl.² C02D *1/02*
U.S. Cl. 99—275 7 Claims



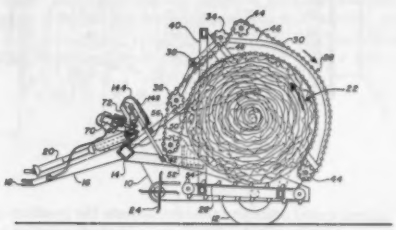
1. In a system for carbonating and cooling a liquid,
a. an upright enclosed vessel,
b. an upright carbonating column including a heat conductive wall portion, said column being centrally disposed in and supported by said vessel, said column and vessel defining an upright channel therebetween,
c. the upper portion of the carbonating column including an opening in communication with said channel,
d. means defining a source of liquid to be carbonated,
e. a source line connected between the carbonating column at a location proximal to the lowermost portion of the carbonating column and the means defining a liquid source,
f. means defining a source of liquid carbon dioxide,
g. means for injecting liquid carbon dioxide from its means defining a source into liquid to be carbonated, said carbon dioxide being introduced into said carbonating column at a location proximal to the lowermost portion of said carbonating column, and
h. an outlet line connected to a lower portion of the channel for removing cooled carbonated liquid therefrom, wherein said carbonating column is of sufficient height to provide sufficient residence time to accomplish stabilizing of the carbon dioxide bubbles in the liquid.

4,022,120

ELECTRICALLY POWERED TWINE WRAPPER FOR ROUND BALES

Ronald L. McAllister, New Holland, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed June 17, 1976, Ser. No. 697,285
Int. Cl.² B65B *13/18*
U.S. Cl. 100—5 12 Claims



1. A machine for forming round bales of crop material having means to wrap twine around such round bale, said machine comprising in combination;
a. a mobile baling machine having means to pick up a swath of crop material from a field and coil it about a horizontal axis into a round bale, said machine including a frame having a forward position adapted to be connected to a tractor for movement along a field,
b. means of said frame to support a supply of twine,
c. an upstanding member on the foward portion of said frame intermediately between the sides thereof,
d. a twine directing arm pivotally mounted at one end to said upstanding member for oscillation of the opposite outer end of said arm downwardly from a position adjacent one side of said frame and then upwardly to a position adjacent the opposite side of said frame, said opposite end of said arm receiving and dispensing twine from said supply thereof to effect a roving of said twine around and between opposite ends of a round bale when formed in said machine,
e. an electric motor having a rotatable shaft supported by said upstanding member,
f. drive means connected between said drive shaft of said motor and said one end of said twine directing arm to effect said oscillation of the opposite outer end thereof,
g. control control means for said motor operable to start and stop the same, and h. a circuit between a source of power and said motor and Control means, and limit switches in said power circuit operable to stop said motor respectively at the end of each oscillating movment of said twine directing arm.

4,022,121

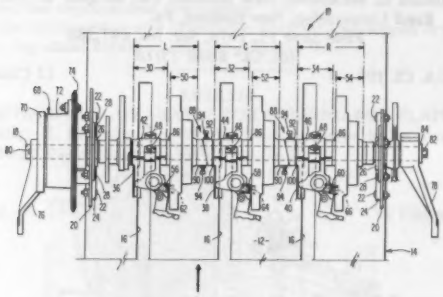
ADJUSTMENT CAMS FOR REMOVING END PLAY FROM TYING MECHANISM ON A BALER

LeRoy A. Crawford, New Holland, and Irwin D. McIlwain, Lancaster, both of Pa., assignors to Sperry Rand Corporation, New Holland, Pa.

Filed Aug. 18, 1976, Ser. No. 715,360
Int. Cl.² B65B *13/18*
U.S. Cl. 100—29 10 Claims

1. In a tying mechanism on a baler having a bale forming chamber, said mechanism including an elongated shaft and at least two units mounted along said shaft and operable to carry out tying of strands of material that band a bale being formed in said bale chamber, at least one of said units being movable axially along said shaft for adjusting the position thereof relative to the other of said units, the improvement comprising:
a pair of elements on said shaft between said units, said elements engaging one another and at least one of said elements being movable to various angular positions

relative to the other of said elements about said shaft to change the width of the space occupied by said elements



between said units and thereby adjusts the position of said one movable unit axially along said shaft relative to said other unit.

4,022,122

PRESSING INSTALLATION FOR A COPYING ARRANGEMENT

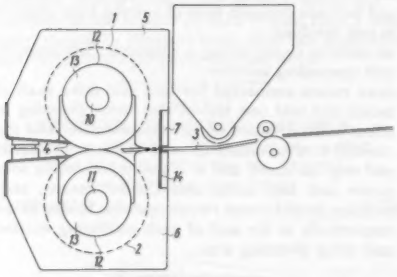
Kurt Moser, Gerlingen; Reinhold Weigele, Korntal, and Wolfgang Pfeil, Kornwestheim, all of Germany, assignors to Develop KG/Dr. Eisbein and Co., Germany

Filed Aug. 16, 1974, Ser. No. 498,236

Claims priority, application Germany, Aug. 16, 1973, 2341530

Int. Cl.² B30B *3/04*

U.S. Cl. 100—158 R **32 Claims**



1. A pressing installation for a copying arrangement, the installation comprising:

at least two opposed pressure roller means mounted on shafts,

bearing block means for supporting each of said pressure roller means with the axis of said shafts being arranged at a mutual angle with respect to each other such that upon application of a pressure on the pressure rollers means, said shafts are inclined toward one another at least at respective end zones thereof,

a flat spring joint means disposed on one side of said pressure roller means and extending between the bearing block means for pivotably connecting said bearing block means,

means provided at said spring joint means for fixing an area of pivoting of said spring joint means, and

means disposed on the other side of said pressure roller means opposite said spring joint means for adjustably securing said bearing block means to each other.

4,022,123

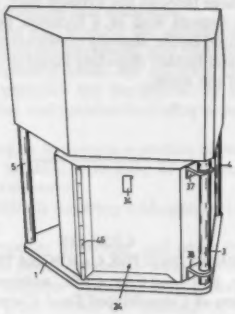
GARBAGE COMPACTOR

Hans Bachmann, Lenzburg, Switzerland, assignor to Soder A.G. Maschinenfabrik, Lenzburg, Switzerland

Filed Dec. 23, 1975, Ser. No. 643,958

Int. Cl.² B30B *15/00, 15/04, 15/16*

U.S. Cl. 100—229 R **6 Claims**



1. A garbage compactor comprising:

a rigid frame structure including essentially a lower horizontally arranged base plate, an upper horizontally arranged top plate and at least three interconnecting bars fixedly connecting said top plate to said base plate in parallel relationship to said base plate at a fixed distance therefrom;

a garbage container arranged between said base plate and said top plate including a fixed wall section, a movable wall section, means pivotally connecting said movable wall section to said fixed wall section for enabling said fixed wall section to pivot about a vertical axis between a closed position and an open position in the manner of a door, connector means pivotally connecting said garbage container to one of said interconnecting bars so that said container is supported by said one of said interconnecting bars, said connecting means permitting said garbage container to be displaced vertically a small amount along said one of said interconnecting bars wherein the fixed wall section and the movable wall section are of octagonal configuration as viewed from above when said movable wall section is in its closed position, said wall sections consisting of four wider wall parts and four smaller wall parts, said connector means comprising an upper carrier member extending outwardly from one of said smaller wall parts and a lower carrier member extending outwardly from said one of said smaller wall parts, a circular opening provided in said carrier members positioned over said one of said interconnecting bars;

a pressure generating subassembly arranged on top of said top plate and a vertically movable compactor ram connected to said pressure generating subassembly; and

wherein said compactor ram corresponds in its cross-section to the interior shape of said garbage container and is displaceable into said garbage container and out of said garbage container by actuation of said pressure generating subassembly.

4,022,124

PRINTING MACHINE

David S. Knudsen, St. Louis, Mo., assignor to McKenna Equipment Company Inc., St. Louis, Mo.

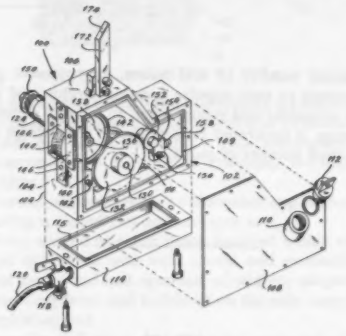
Filed Oct. 29, 1975, Ser. No. 626,790

Int. Cl.² B41F *17/00*

U.S. Cl. 101—36 **16 Claims**

1. In a machine for printing letters, numbers, symbols, and the like on elongated material and including a base structure,

a printing wheel on the base structure and being rotatable with respect to it, the printing wheel having raised characters along the periphery thereof, and means for urging the elongated material against the periphery of the printing wheel, an improved inking unit for applying ink to the raised characters on the printing wheel, said inking unit comprising: a sealed case mounted on the base structure for pivotal movement about a pivot axis; an ink reservoir on the case and opening upwardly into the interior of the case for containing a supply of liquid ink; an ink transfer wheel in the case remote from the reservoir and having a peripheral surface, a small portion of the ink transfer wheel being projected through a case with the peripheral surface at said small portion being in contact with the raised characters on the printing wheel, the ink transfer wheel being rotatable in the case about an axis which is offset from the pivot axis of the case such that the peripheral surface of



the transfer wheel will move toward or away from the printing wheel as the case pivots about its pivot axis; seal means on the case where the transfer wheel emerges from the case for isolating the interior of the case from the surrounding atmosphere; an ink pick-up wheel mounted in the case for rotation about an axis which is coincident to the pivot axis for the case whereby the spacing between the ink pick-up wheel and the printing wheel does not vary irrespective of the angular position of the case, the ink pick-up wheel projecting into the ink reservoir so as to pick up ink on the periphery thereof, the ink pick-up wheel passing close enough to the ink transfer wheel within the case to transfer ink to the periphery of the ink transfer wheel, whereby the ink will be transferred to the raised characters and thence to the elongated material in the configuration of the raised characters; and means for driving the ink pick-up wheel, the ink transfer wheel and the printing wheel all at substantially the same peripheral velocity.

4,022,125

DAMPENING APPARATUS FOR OFFSET PRINTING

Gaylon N. Weaver, 3930 Villanova, Houston, Tex. 77005

Filed July 7, 1975, Ser. No. 593,541

Int. Cl.² B41L *25/02*

U.S. Cl. 101—148 **12 Claims**

1. A dampening system for offset printing machines incorporating non-integrated ink systems and having a rotatable plate cylinder for rotating a photograhic printing plate and having an ink supply system for coating specific portions of a photographic printing plate carried by said plate cylinder upon rotaton of said plate cylinder, said dampening system comprising:

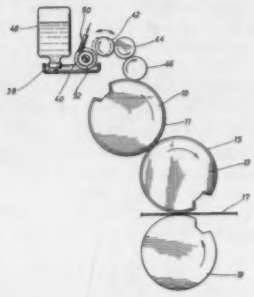
a dampening roller framework being connected to said printing machine;

dampening liquid supply means supported by said framework;

a fountain roller having supported by said framework and receiving dampening liquid from said damping liquid supply means;

a ductor roller having a yieldable peripheral surface being rotatably supported by said framework adjacent said fountain roller and being adapted for lateral reciprocating movement into engagement with said fountain roller to remove a quantity of dampening liquid from said fountain roller;

a rider roller being supported by said framework adjacent said ductor roller and being intermittently engaged by said ductor roller to intermittently transfer dampening liquid from said ductor roller to said rider roller, said rider roller having a smooth cylindrical relatively unyielding non-metallic non-abosrbent outer peripheral surface and imparting driving rotation to said ductor roller;



a dampening form roller having a smooth yieldable outer peripheral surface, and being supported by said framework with the outer periphery thereof in engagement with said rider roller and with said printing plate, said rider roller, dampening form roller and plate cylinder revolving at substantially the same peripheral speed and said rider roller and dampening form roller having a touching low mechanical driving pressure relationship therebetween; and said dampening form roller receiving dampening liquid from the said rider roller and applying said dampening liquid to said printing plate in evenyl distributed finely beaded form, said dampening liquid substantially preventing transfer of ink from said printing plate to said dampening form roller.

4,022,126

LETTER PRESS PRINTING PRESS

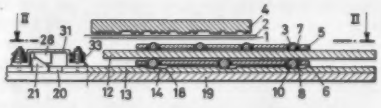
Werner Wüthrich, Gumligen, Switzerland, assignor to Autelca, AG, Gumligen, Switzerland

Filed May 4, 1976, Ser. No. 683,052

Claims priority, application Switzerland, May 5, 1975, 5731/75

Int. Cl.² B41F *3/20*

U.S. Cl. 101—269 **2 Claims**



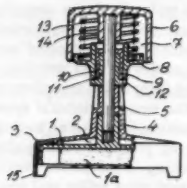
1. A letterpress printing press in which one or more stacked sheets, which each have a surface which changes color under the influence of pressure or which each come into contact with a dye film support comprising a layer which is rubbed off under the influence of pressure, are pressed against a printing form by the application of pressure by at least one cylindrical roller, comprising a roller cage, a print transfer plate equipped with sliding drive means, at least one needle-shaped roller mounted in said cage on one side of said print transfer plate and rollers whose axes are parallel to that of the needle-

shaped roller mounted in said cage on the other side of said print transfer plate, a plate connected parallel to the printing form, said last mentioned rollers connected to roll on said plate parallel to the printing form, said plate having lateral grooves into which the rollers are adapted to roll prior to and after the printing operation in order to increase the space between the needle-shaped rollers and the printing form for the purpose of inserting the sheet or sheets to be printed and for removing the same, and oppositely disposed spur wheels which include straight teeth are mounted on the sides of said roller cage parallel to the direction of displacement of the print transfer plate, cog-racks attached to the print transfer plate, cog-racks connected to said plate, said spur wheels meshing with said cog-racks on said print transfer plate and with said cog-racks on said plate and the tooth length of the said straight teeth being such that said spur wheels mesh with the cog-racks connected to said plate even when said rollers are in the lateral grooves.

4,022,127
SELF-INKING HAND STAMP

Per-Arne Carlsson, and Bengt Darhult, both of Elinsdalsgatan 8, 502 56 Boras, Sweden

Filed Mar. 26, 1976, Ser. No. 670,592
Claims priority, application Sweden, Apr. 30, 1975, 7505098
Int. Cl.² B41F *1/38*
U.S. Cl. 101—327 4 Claims



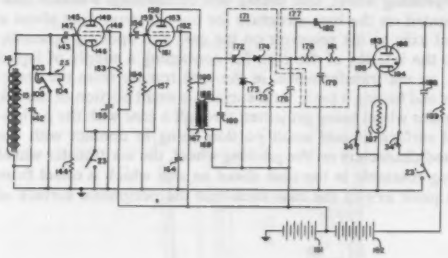
1. In a self-inking stamp, having
a handle,
a base,
a socket movably mounted in a recess in said base,
a self-inking block located in said socket and being provided with symbols on one side for delivering a print of said symbols to a member adapted to receive said print,
spring means an elongated shaft displaceably mounted in said base for interconnecting said handle and said socket for common reciprocal movement relative to said base in said handle for biasing said socket to a retracted position in said recess and
a hub carried in said handle for engaging a stop means for adjustably restricting the longitudinal displacement of said shaft and said socket,
said stop means having a two-part bushing of variable length disposed between the handle and the base and surrounding said shaft and wherein the parts more relative to each other to vary the length of the bushing.

4,022,128
LAND MINE

Jack H. Watson, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 23, 1960, Ser. No. 78,189
Int. Cl.² F42C *11/00*
U.S. Cl. 102—19.2 8 Claims

1. A detonating circuit comprising a coil responsive to an external magnetic field, a vibration responsive switch connected in parallel with said coil having a closed position and an open position, said switch responsive to external vibration for vibrating between said open and closed positions, an electronic amplifier coupled to said switch and to said coil and biased to provide constant amplitude pulses having periods equal to the vibration rate of said switch, an impulse forming circuit coupled to said amplifier having means for storing a

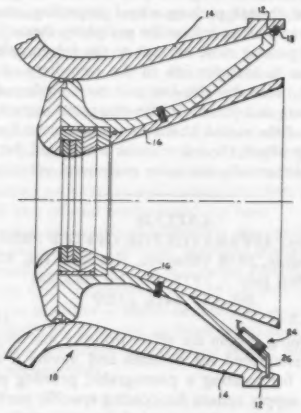


predetermined number of said pulses, an explosive primer, means coupled to said impulse forming circuit and to said primer for actuating said primer when an impulse of predetermined energy is generated in response to the receipt of said predetermined number of pulses.

4,022,129
NOZZLE EJECTION SYSTEM

John E. Day, Truckee, and Phil D. La Force, Los Gastos, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 16, 1976, Ser. No. 649,765
Int. Cl.² B64C *15/02*
U.S. Cl. 102—49.5 5 Claims

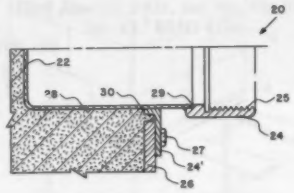


1. A nozzle ejection system comprising a first nozzle, said first nozzle having a groove located along the inner periphery thereof, a second nozzle, said second nozzle positioned within said first nozzle, a snap ring located within said groove and in engagement with said second nozzle for retaining said second nozzle within said first nozzle and means operatively associated with said snap ring for releasing said snap ring at a predetermined time from said groove thereby permitting the ejection of said second nozzle from within said first nozzle.

4,022,130
EJECTABLE FUZE

Clifford T. Johnson; Melvin J. McCubbin; Patrick M. McInnis, and Joseph F. Mattis, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 6, 1976, Ser. No. 655,928
Int. Cl.² F42B 33/04
U.S. Cl. 102—56 R 5 Claims



1. In a warhead mechanism comprising a cavity containing a main charge of high explosive confined between opposing bulkheads and a container for a fuze mechanism fastened within an opening in one of said bulkheads, the improvement comprising:

said container comprising an elongated cup shaped member having a closed end and an open end;

said cup shaped member being fastened within said one of said bulkheads with said closed end protruding within said cavity and said open end of said cup shaped member extending from said bulkhead on the side away from said explosive; and

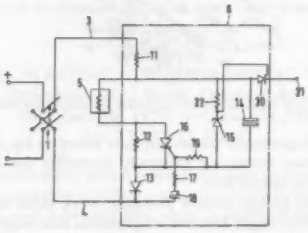
an annular end piece joined to the open end of said cup shaped member for closure thereof;

the joining of said end piece to said cup shaped member being made such that the joint will fail when a predetermined level of temperature is exceeded at said joint and a predetermined pressure is exceeded within said container.

4,022,131
ELECTRICALLY-OPERATED RELEASE APPARATUS

Robert J. Redding, September House, Cox Green Lane, Maidenhead, Berkshire, England (SL6 3EL)

Filed Dec. 9, 1975, Ser. No. 639,059
Int. Cl.² F42B 5/08
U.S. Cl. 102—70.2 R 4 Claims

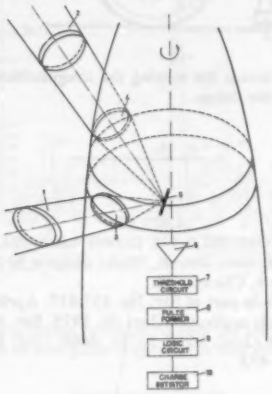


1. A release apparatus comprising an electrically rupturable link; electrical energy storage means; and a circuit operative, in response to a voltage applied thereto, to charge the storage means whilst the applied voltage is in a first polarity condition and at least partially to discharge the stored energy into the link to rupture the link when the applied voltage changes to a polarity condition opposite of said first polarity condition.

4,022,132
PASSIVE INFRA-RED PROXIMITY FUZE

Åke Hugo Petrus Blomqvist, and Bertil Torbjörn Eriksson, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed June 17, 1975, Ser. No. 587,568
Claims priority, application Sweden, June 25, 1974, 7408307
Int. Cl.² F42C 13/02
U.S. Cl. 102—70.2 P 2 Claims



1. Apparatus for use in a projectile-borne passive infra-red proximity fuse to detect infra-red radiation emitted from a target comprising:

detector means,

at least one pair of optical means respectively located at spaced locations around the periphery of the projectile, each of said optical means imaging on said detector means the infra-red radiation from the target which radiation travels along a predetermined axis, the axes of said at least one pair of optical means forming an angle relative to each other both in a plane through the longitudinal axis of the projectile and in a plane normal to such axis,

said detector means producing an output signal in response to the imaging thereon of radiation by either of said at least one pair of optical means,

and means controlled by said detector means to a distinctive condition in response to the radiation imaged upon said detector means by both said optical means from said target while said projectile spins about its longitudinal axis and is within a predetermined distance of the target.

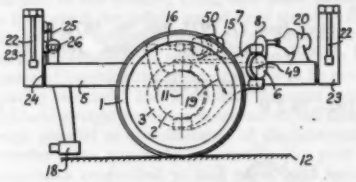
4,022,133
LATERAL TRUCK MOVEMENT CONTROL SYSTEM

K. Julius Lindblom, Sollentuna, and Anders S. E. Kipping, Enskede, both of Sweden, assignors to Automatisk Doserings Kompensator AB, Sollentuna, Sweden

Filed Jan. 14, 1975, Ser. No. 531,378
Int. Cl.² B61D 3/12, 3/16, 5/38, 13/00
U.S. Cl. 105—157 R 7 Claims

1. A device for reducing lateral movements of a railway vehicle caused by irregularities in the vertical surfaces of the rails carrying said vehicle, comprising, at least one wheel flange of the vehicle mounted on the vehicle by support means for limited rotation around a generally vertical axis, a separate power-operated control means for performing said limited rotation by engaging said support means and being operatively

connected between the wheel flange and the vehicle, said separate power-operated control means being actuated and



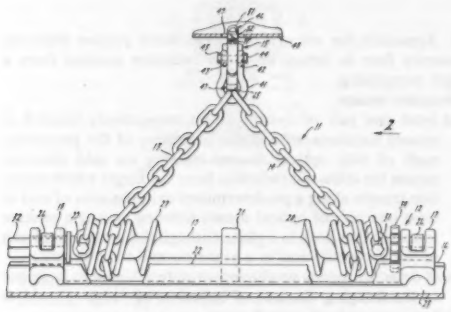
controlled by means for sensing the irregularities in the rail thus affecting the flange.

4,022,134

AUTOMOBILE TIE DOWN ASSEMBLY

Raymond M. Krokos, Detroit, Mich., assignor to Evans Products Company, Chicago, Ill.

Continuation-in-part of Ser. No. 457,817, April 4, 1974, abandoned. This application Jan. 20, 1975, Ser. No. 542,616
Int. Cl.² A44B *13/00*; **B25B** *25/00*; **B60P** *7/08*; **B61D** *45/00*
U.S. Cl. 105—473 **1 Claim**



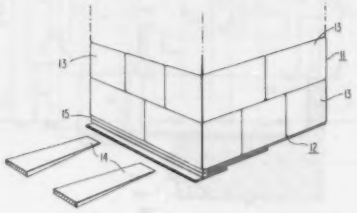
1. A tie-down fiting for providing a detachable connection to a first load having an elongated opening defined by parallel sides and a second load having a generally circular opening, said tie-down fitting having first and second attachment parts angularly disposed relative to each other and connected to a base part, said base part having an opening formed therein for affording a pivotal connection to a flexible transmitter, said first attachment part comprising an elongated portion adapted to extend into the elongated hole and having a length greater than the distance between the parallel sides for engagement therewith to afford a detachable connection to the first load, a generally flat-sided portion formed directly adjacent said elongated portion for engaging the parallel sides for precluding rotation of said fitting relative to said first load when said fitting is tensioned, and a generally curved portion positioned between said flat sided portion and said base part, said curved portion being configured to permit said tie-down fitting to be rotated for entry of said elongated portion into the elongated opening between the parallel sides and subsequent return of said elongated portion to an overlying relation with the parallel sides, said second part comprising a hook portion adapted to extended into the generally circular hole and having a flattened end adapted to engage the inner surface of the member in which said circular hole is formed and a pad portion spaced from said hook portion and adapted to engage the outer surface of the member in which said circular hole is formed.

4,022,135

LIFT SHEET

Edward W. Bauman, Jr., Chadds Ford, Pa., and Edwin J. McLean, Lansing, Mich., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Sept. 11, 1975, Ser. No. 612,270
Int. Cl.² B65D *19/22*
U.S. Cl. 108—51.3 **4 Claims**



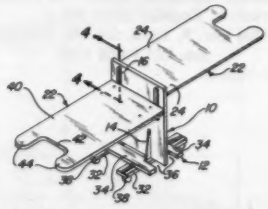
1. A lift sheet for facilitating the lifting of a multiple component unit load from a supporting surface, said sheet comprising a platform portion for supporting a load on the upper surface thereof, said platform portion including a front, fork entry edge and an opposed rear edge, multiple sheet portions disposed in upper and lower stacked relationship beneath said platform portion and adjacent said front edge of said platform portion, the upper stack portions extending inwardly of said platform portion and terminating short of said rear edge, said lower stack portions extending inwardly of said platform portion a lesser distance than said upper stack portions whereby said upper and lower stacked portions provide a stepped configuration for maintaining said platform portion in substantially a planar position when said load is placed thereon.

4,022,136

DESK FOR PHYSICALLY HANDICAPPED PERSONS

James G. Schott, 1723 Robb No. 50, Lakewood, Colo. 80215

Filed June 14, 1976, Ser. No. 695,528
Int. Cl.² A47B *39/00*
U.S. Cl. 108—108 **20 Claims**



1. A desk for handicapped persons confined to wheel chairs comprising:

an upright generally planar support member having retaining means extending generally vertically for adjustably receiving connectors;

a generally planar narrow elongate work table having two lateral end edges and two longitudinal side edges substantially longer than the end edges;

connectors secured to a first end of the table and constructed to engage the retaining means on the support member for vertical adjustment thereon to support the table at variable levels in a substantially horizontal attitude and to disengage the retaining means on occasion;

a recess formed centrally in the second, free end edge of the table to accommodate the torso of a person occupying a

wheel chair and to define at each side of the recess an arm rest for the occupant;

the table arm rests being so located as to overlie the arms of a wheel chair when the occupant is in working position and stabilize the table with respect to the wheel chair.

4,022,137

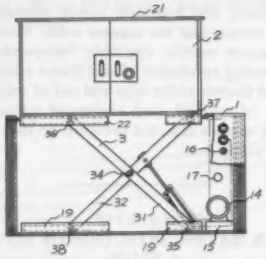
SAFE WITH HYDRAULIC SAFETY PROTECTION

Tsuen Mu Chiu, No. 304, Wu Fong N. Road, Chia-ih, Taiwan, China /Taiwan

Filed June 16, 1975, Ser. No. 586,915

Int. Cl.² E05G *1/10*

U.S. Cl. 109—44 **2 Claims**



1. A safe for protecting valuables comprising:

an outer casing having an open top,

an inner casing for receiving said valuables,

a linkage means within said outer casing for mounting said inner casing within said outer casing for movement between a lower, protected position within said outer case and a stable elevated position permitting entry into said inner casing,

hydraulic means mounted within said outer casing and connected to said linkage means and defining a first hydraulic path for applying a force to elevate said inner casing to said elevated position and a second path permitting said inner casing to return to said lower position,

a source of hydraulic fluid within said outer casing and connected to said hydraulic means for supplying hydraulic fluid under pressure to said hydraulic means, and

first and second locks each includng a first rotatable and annular element and a second element rotatable within said first element and having a dial for rotating the same, each element having a first passage therethrough so that when said elements are rotated to a rise position in which said first passages are aligned whereby a first path is completed to elevate said inner casing and at least one of said element having an oil drain passage so that, when said one element is rotated to a lower position, the oil pressure is released and said inner case is lowered.

4,022,138

DRAPERY PLEATING GUIDE FOR SEWING MACHINES

Robert V. Strickland, 9021 Wedd, Overland Park, 66212

Filed Oct. 10, 1975, Ser. No. 621,380

Int. Cl.² D05B *35/08*

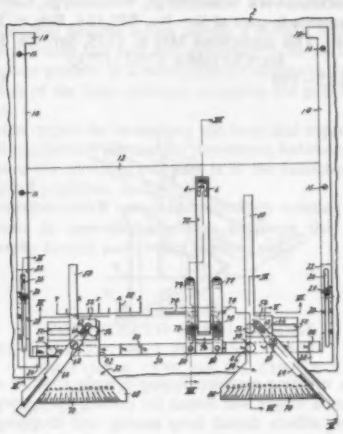
U.S. Cl. 112—146 **10 Claims**

1. In combination with a sewing machine having a bed plate and being operable to stitch a straight line in fabric supported on and moved over said bed plate, a drapery pleating guide comprising:

a. a base plate supported on and movable over said bed plate,

b. guide members limiting movement of said base plate to a line parallel to said stitch line, said base plate overlying said stitch line and being slotted to permit stitching therethrough, and being operable to support a panel of drapery fabric for movement relative to said bed plate,

c. a pair of straight guide fingers overlying and carried by said base plate, said fingers being parallel to said stitch line at transversely opposite sides thereof, and



d. adjusting means operable to vary the transverse spacing of each of said guide fingers from said stitch line.

4,022,139

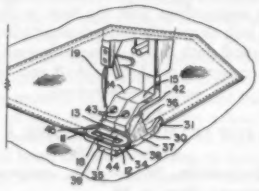
TACKER GUIDE AND METHOD

Charles F. Carson, Greensboro, N.C., assignor to Blue Bell, Inc., Greensboro, N.C.

Filed Oct. 28, 1975, Ser. No. 626,022

Int. Cl.² D05B *35/00, 3/12*

U.S. Cl. 112—150 **4 Claims**



1. A positioning guide for tacking in combination with a tacking sewing machine having a needle and a presser foot, said presser foot having a fabric-engaging bottom surface for tacking multiple fabric plies at a specific location comprising; a fabric stop means on said presser foot fabric-engaging bottom surface for limiting the movement of multiple fabric plies in one direction at a predetermined location beneath the presser foot in juxtaposition to said needle, and a means coacting with said fabric stop means and at an angle thereto on said presser foot fabric-engaging bottom surface for guiding said fabric plies to said fabric stop means.

4. The method of tacking fabric plies on a tacking sewing machine having a needle and a presser foot, said presser foot having a fabric engaging bottom surface with a fabric stop means and a fabric guiding means at an angle thereto and cooperating therewith comprising the steps of guiding a plurality of fabric plies to be tacked along a first path of travel against said fabric guiding means, terminating the displacement of the plurality of fabric plies in the first path of travel upon engaging said fabric stop means thereby positioning the fabric plies in a predetermined tacking location, and tacking the fabric plies in said predetermined location.

4,022,140

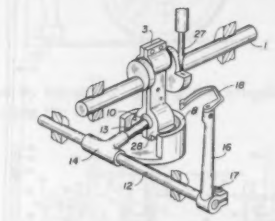
LOOPER DRIVE DEVICE FOR A STITCHING MACHINE

Ernst Lienemann, Kaufungen, Germany, assignor to VEB Nahmaschinenwerk Wittenberge, Wittenberge, Germany

Continuation-in-part of Ser. No. 547,414, Feb. 6, 1975, abandoned. This application May 6, 1975, Ser. No. 575,095

Int. Cl.² D05B *57/02, 57/30*

U.S. Cl. 112—199 **4 Claims**



1. In a stitching machine having a main shaft, a stitching needle and a looper and means for driving the looper so that the looper effects thread loop seizing and dropping movements and needle evading movements, the improvement in which the means for driving the looper comprises a crank rigidly connected to the main shaft, a side mounted at one of its ends on the crank for driving by the crank for rotational movement about the axis of the main shaft, the slide having a free end which is formed with an outer convex spherical-like surface and an inner concave spherical-like surface, the center of the inner spherical-like surface being offset relative to the center of the outer spherical-like surface, a guide cylinder having a segment-shaped inner surface, the outer spherical-like surface being received in and guided by the inner surface of the guide cylinder, a ball element having a bore and being rotatably mounted in the inner concave spherical-like surface, a looper shaft mounting the looper, a transmission lever having one end rigidly connected to the looper shaft and the other end in sliding engagement with the bore in the ball element whereby said ball element is moved longitudinally and laterally in an elliptical path and said transmissions element transmits such movement to the looper shaft and looper.

4,022,141

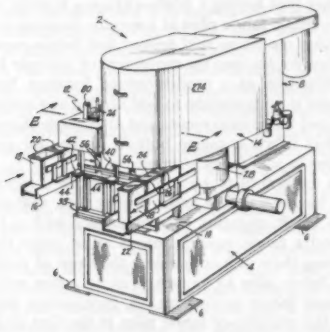
MACHINE FOR SEAMING TOGETHER A LID AND A CONTAINER

Michael F. Bartenstein, Proctor, Vt., assignor to Vermont Marble Company, Proctor, Vt.

Filed Sept. 9, 1975, Ser. No. 611,623

Int. Cl.² B21D *51/32*

U.S. Cl. 113—58 **12 Claims**



1. A seaming machine for securing a lid to an open container, said machine including: chuck means; means for clamping said open container against said chuck means, with said lid between said open container and said chuck means; a frame assembly mounted to revolve about said chuck means; means connected with said frame assembly for effecting revolution thereof about said chuck means; at least one pair of oppositely disposed bracket means carried by said frame assembly, said bracket means being disposed on opposite sides of said chuck means, and being reciprocally slidable relative to said frame assembly toward and away from said chuck means; guide means engaged with said reciprocally slidable bracket means, and effective to guide said slidable bracket means along a given path as said frame assembly is revolved about said chuck means; seamer roller means reciprocally mounted on each of said bracket means, for movement relative to its associated bracket means toward and away from said chuck means; and hydraulic means connected between each bracket means and the seamer roller means associated with said bracket means, operable independently of said means for effecting revolution of said frame assembly to move said associated seamer roller into and out of engagement with the periphery of said lid, and adjustable universally over a given range to exert a selected pressure on said lid periphery for forming a seam.

4,022,142

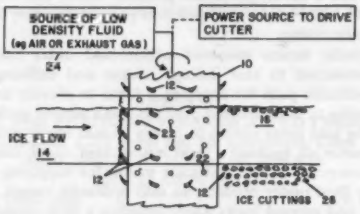
ICE CUTTER HAVING INJECTION OF LOW DENSITY FLUID

Richard D. Stegall, Richardson, Tex., assignor to Suntech, Inc., St. Davids, Pa.

Filed May 14, 1976, Ser. No. 686,356

Int. Cl.² B63B *35/12*

U.S. Cl. 114—42 **3 Claims**



1. An ice cutting system for cutting ice on water and adapted to cut the ice efficiently and also to cause resulting ice chips to sink into the water below the ice and comprising:

a. an ice cutter for cutting away ice chips from ice on water, and including a mechanical power means for driving said cutter past the surface of the ice to chip away at the ice; and

b. means, including apertures in the ice cutter and not including said mechanical power means, for injecting through said apertures a fluid, having a density less than the density of the water-ice slurry around the cutter, into the region where the cutter contacts the ice, whereby the resulting lower density of fluid in that region results in a more efficient cutting operation and also results in the ice chips sinking in the lower density slurry around the cutter until they are dissipated into the water beneath the ice.

4,022,143

WIDE-KEELED BOAT HULL WITH MULTIPLE, STRAIGHT LINE PLANING SURFACES

Leo M. Krenzler, 2556 E. 11th St., Tacoma, Wash. 98421

Filed Sept. 24, 1975, Ser. No. 616,488

Int. Cl.² B63B *1/18*

U.S. Cl. 114—271 **4 Claims**

1. A high speed planing boat hull including a transom stern, freeboard side portions extending from the transom and termi-

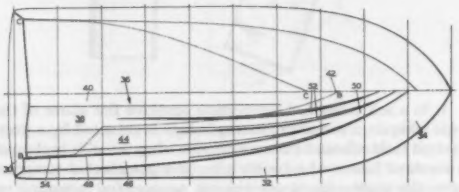
nating in a V-bow, a keel centerline extending the longitudinal extent of the hull and having a wide keeled lower hull portion extending from the keel centerline to outer chine junctures with the side portions, the wide keeled lower hull portion comprising

a. keel sidewalls forming deadrise angles between 25° and 35°,

b. keel bottom surfaces which are flat at the transom but progress forwardly to form increasing deadrise angles and to merge into the keel sidewalls slightly above the point at which the planing water line intersects the hull,

c. first steps adjacent the keel bottom surfaces, substantially parallel to the horizontal plane of the keel centerline and having deadrise angles between 5° and 10°,

d. risers extending at steep deadrise angles from inner chine junctures with the first steps to locate the first steps below the outer chines,



e. second steps interconnecting the risers and the side portions, substantially parallel to the horizontal plane of the keel centerline and having deadrise angles between 5° and 10°,

f. spray strips, to direct the water onto the first steps, located on the lower hull portion and extending from the V-bow rearwardly to a point above the intersection of the planing water line with the boat hull,

g. retention strips, to keep the water from spilling off of the first steps, located adjacent the inner chine junctures and comprising short, slightly downwardly angled steps, and

h. the outer chine juncture, the inner chine junctures and the juncture of the displacement section and the second steps are substantially parallel to the vertical plane of the keel centerline.

4,022,144

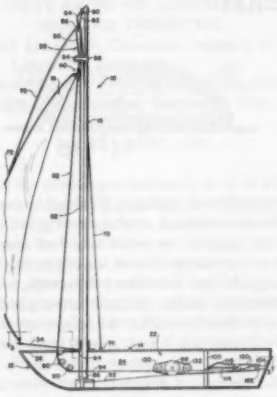
SAILING CRAFT

James Wallace Gitchel, 11050 Fancher Road, No. 138, Westerville, Ohio 43081

Filed Apr. 15, 1976, Ser. No. 677,362

Int. Cl.² B63H *9/10*

U.S. Cl. 114—104 **25 Claims**



1. A sail launching and retraction control apparatus for a sailing craft having a first sail with at least a part of the first sail being movable between positions where the first sail is launched and retracted, comprising:

a. rotatably mounted drum means having a peripheral surface;

b. elongated flexible means having a portion connected to the movable sail part and extending from such sail connection portion in a substantially continuous loop with a reach of the loop drivingly engaging the peripheral surface;

c. guide means for tensioning the loop and supporting the sail connection portion for movement between locations where the movable sail part is in the launched and retracted positions; and,

d. reversible motor means for selectively rotating the drum means in opposite directions to move the loop and thereby launch and retract the first sail.

4,022,145

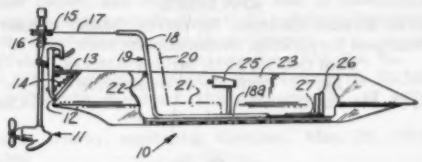
CONTROLLED ONE MAN BOAT

Bobby G. Tindal, Rte. No. 1, Pelion, S.C. 29123

Filed Oct. 6, 1975, Ser. No. 619,819

Int. Cl.² B63H *21/26, 25/00*

U.S. Cl. 114—153 **3 Claims**



1. A controlled one man boat, comprising in combination, an electrically operated motor secured by a spring loaded bracket to a transom of a hull of said boat, a rope for manipulating said electrically operated motor, said rope leading forwardly from said transom towards a space for an operator, a pair of forwardly-rearwardly extending tubular members providing guide means for said rope, a seat and a back rest for said operator, and a pivotable foot rest providing steering means for said motor, said tubular members being parallel to each other and spaced apart, a forward portion of said tubular members being secured to a floor within said hull, an intermediate portion of said tubular members extending upwardly inclined from said floor to an elevation higher than a top gunwale of said boat, and a rear portion of said tubular members extending horizontally rearwardly from said upwardly inclined portion, a cross member secured to said intermediate portion of said tubular members and being also secured fixedly to an interior sides of said boat, a cross brace secured between said rear portions of said tubular members, said rope extending from a rear ends of said tubular member rear portions and being passed around a pulley fixed on a downward extending shaft which at its lower end carries said motor, said shaft being journalled in a bearing block supported from said transom.

4,022,146

FLUID PRESSURE CONTROLLED CIRCUIT BREAKER AS BOAT SAFETY APPARATUS

Clinton P. Sadler, 6069 Beechwood, Haslett, Mich. 48840

Continuation-in-part of Ser. No. 446,125, Feb. 27, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,208

Int. Cl.² B63H *19/00*

U.S. Cl. 115—76 **5 Claims**

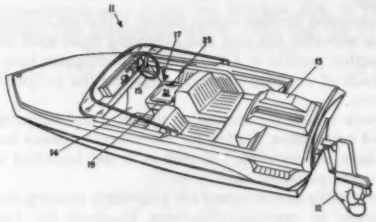
1. A safety system for a motor boat, the engine thereof having an electrically operated ignition system comprising:

a first inflatable air bladder disposed normally to inflatedly bear the weight of an operator of said motor boat; and

a second inflatable air bladder pneumatically connected to

said first air bladder so that decompression thereof deflates said second air bladder; and

pneumatically actuated electrical switch means in the circuit of said ignition system so disposed physically with relation to said second bladder that deflation of said bladder de-actuates said electrical switch means, so as to interrupt said ignition.



4,022,147

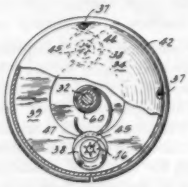
FLYWHEEL IMPELLED CYCLE SIGNAL FOR APPLIANCE

Warren Richard Hafstrom, Stevensville, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 22, 1975, Ser. No. 624,716

Int. Cl.² F26B *19/00*; G08B *21/00*

U.S. Cl. 116—67 R **16 Claims**



8. In a laundry appliance having drive means for rotatably driving components of the appliance during an operative cycle, signal means responsive to any substantial change in the speed of the drive means for audibly indicating a cycle change, said signal means comprising:

a shaft rotated by and connected to and coaxial with said drive means;

an audible signal device fixed to said shaft for rotation therewith; and

a flywheel journaled on said shaft adjacent said audible signal device, said flywheel including clapper means for striking said audible signal device during rotation of said flywheel with respect to said shaft and producing an audible signal.

16. In an appliance having drive means for rotatably driving components of the appliance, signal means for audibly indicating a deceleration of said drive means; said signal means comprising:

flywleel means carried by a shaft threadedly connected to said drive means for synchronous and non-synchronous rotation with the drive means, said non-synchronous rotation being caused by acceleration or deceleration of said drive means;

one-way clutch means for preventing non-synchronous rotation caused by acceleration of said drive means;

bell means for producing an audible signal in response to striking contact with a portion thereof; and

clapper means for striking said bell means in response to said non-synchronous rotation caused by said deceleration of said drive means.

4,022,148

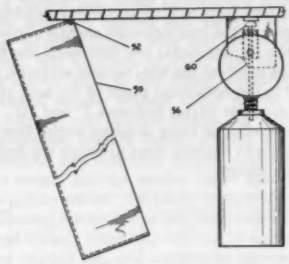
PORTABLE FIRE ALARM

Andrew Ernest Schofield Chapman, 16 Hawkshaw Avenue, Darwen, Lancashire, England

Filed Sept. 22, 1975, Ser. No. 615,569

Int. Cl.² G08B *17/00*

U.S. Cl. 116—106 **1 Claim**



1. In a self contained temperture sensitive fire alarm of the type wherein a sound producing means is actuated by a pressurized fluid released from a reservoir when a seal is broken as a result of fusion of a fusible plug at a preselected temperature, the improvement comprising: a cover for mounting on the underside of a substantially horizontal surface by means of a pivotal mounting at one end thereof and said fusible plug at the opposite end thereof; and a reservoir, housed within said cover and having a valve seal and associated plunger and striker means, for pivotal mounting on said horizontal surface at a position adjacent said fusible plug so that, upon fusion of said fusible plug as a result of a rise in ambient temperature to said preselected temperature, said cover and said reservoir pivot away from each other, under gravity, to a substantially vertical position in which said plunger contacts said striker means thereby depressing said plunger so as to break said valve seal and release said fluid.

4,022,149

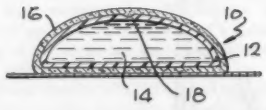
THAW INDICATOR

Lee Berger, 9981 Wildwood Way, Villa Park, Calif. 95486

Filed Feb. 6, 1976, Ser. No. 655,689

Int. Cl.² G01K *11/08*

U.S. Cl. 116—114.5 **11 Claims**

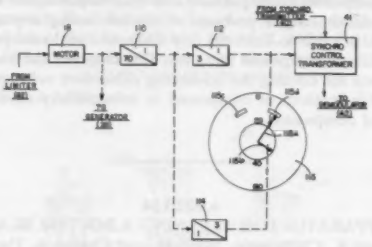


1. A thaw indicator comprising a frangible capsule formed from an edible wax material, a mixture of gelatin and colored liquid inside the capsule, an outer cover of non-toxic absorbent material surrounding at least a portion of the outer surface of said capsule and in contact therewith, whereby when said thaw indicator is frozen, said mixture expands and breaks said capsule and when thereafter the temperature of said thaw indicator rises above a predetermined level for a predetermined period of time, the mixture melts and is absorbed by and stains said absorbent material to provide an indication that the material has been subjected to unsafe temperatures for an excessive period of time.

4,022,150
SAILBOAT STEERING INDICATOR SYSTEM

Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Division of Ser. No. 549,381, Feb. 12, 1975, Pat. No. 3,943,764. This application Nov. 5, 1975, Ser. No. 628,642
Int. Cl.² G01C *21/00*; G09F *9/00*
U.S. Cl. 116—129 T 2 Claims



1. In a sailboat steering indicator system having a plurality of means means for generating a rotational mechanical signal in accordance with apparent wind direction, means for providing a display in response to said signal, the improvement comprising:

indicator means having a first dial portion and a first dial pointer for indicating all apparent wind directions, a second vernier dial pointer and dial portion for indicating apparent wind direction in a predetermined close-haul range and marker means on said first dial portion for indicating when the apparent wind direction is in said predetermined close-haul range,

first gear means driven by said mechanical signal for driving said first dial pointer at a predetermined stepdown ratio to said mechanical signal, and

second gear means driven by said mechanical signal for driving said second dial pointer at a predetermined step-up ratio to said dial first pointer,

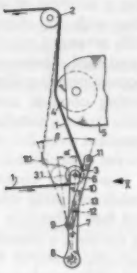
said first and second gear means providing a rotational ratio between said pointers whereby said second pointer rotates a number of times for each rotation of said first pointer and indicates readings on said second dial portion in said predetermined close-haul range when said first pointer is opposite the marker means on the first dial portion.

4,022,151
APPARATUS FOR PIVOTING A TENSIONED WEB OF MATERIAL AWAY FROM AN ADHESIVE APPLICATOR ROLLER THEREFOR

Fritz Achelpohl, Lengerich, Germany, assignor to Windmoller & Holscher, Lengerich, Germany

Filed May 27, 1975, Ser. No. 580,960
Claims priority, application Germany, May 27, 1974, 2425534
Int. Cl.² B05C *1/08*
U.S. Cl. 118—33 3 Claims

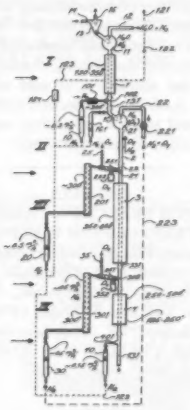
1. Apparatus for pivoting a tensioned web of material away from an adhesive applicator roller therefor comprising in combination, first pivotal levers, a guide roller for the web mounted on said first pivotal levers, said guide roller being movable by said first pivotal levers between a first position for holding the web against the adhesive applicator roller and a second position for permitting the web to move away from the adhesive applicator roller, second pivotal levers, a web tensioning bar extending parallel to said guide roller mounted on said second pivotal levers, means for pivotally moving said second levers in response to the pivotal movement of said first levers to position said web tensioning bar in an inoperative position out of engagement with the web in the first position of said guide roller and in an operative position in tensioning engagemment with the web in the second position of said guide roller with the web away from the adhesive applicator roller.



4,022,152
APPARATUS FOR MAKING PARTICULATE MATERIALS, PARTICULARLY OXIDES, HYDROPHOBIC

Siegmar Laüfer, and Waldemar Roy, both of Rheinfelden, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Division of Ser. No. 241,761, April 6, 1972, Pat. No. 3,920,865, which is a continuation-in-part of Ser. No. 23,330, March 27, 1970, abandoned. This application Dec. 17, 1974, Ser. No. 533,675
Claims priority, application Germany, Mar. 29, 1969, 1916360
Int. Cl.² C23C *13/08*
U.S. Cl. 118—49.5 6 Claims



1. An arrangement for the treatment of particulate materials, particularly for the continuous treatment of oxides, to make them hydrophobic, comprising a tubular, substantially vertically arranged activating oven for activating a particulate material; means for the admission of said material into said activating oven, said admitting means communicating with an upper end of said activating oven; a separating chamber located below said activating oven; a first connecting conduit connecting a lower end of said activating oven with said separating chamber; a first inlet conduit for an inert gas communicating with said first connecting conduit; a second inlet conduit for an inert gas communicating with said first connecting conduit; a gas outlet conduit communicating with an upper end of said separating chamber; a charging conduit for charg-

ing said material with a substance capable of imparting hydrophobic characteristics to said material, said charging conduit communicating with a lower end of said separating chamber; a third inlet conduit for a mixture of an inert gas and said substance communicating with said charging conduit; a tubular, substantially vertically arranged reaction oven for reaction between said material and said substance, said reaction oven having an upper end communicating with said charging conduit; a second connecting conduit communicating with a lower end of said reaction oven; a tubular, substantially vertically arranged after-treatment oven for after-treatment of said material to eliminate excess of said substance, said after-treatment oven having an upper end communicating with said second connecting conduit; a fourth inlet conduit for a mixture of an inert gas and said substance communicating with said second connecting conduit; a material outlet conduit for removal of said hydrophobic material from said after-treatment oven, said material outlet conduit communicating with a lower end of said after-treatment oven; a fifth inlet conduit for an inert gas communicating with said material outlet conduit; a first flow meter communicating with said third inlet conduit for measuring the quantity of inert gas flowing through said third inlet conduit; a first preheater communicating with said third inlet conduit for preheating the inert gas flowing through said third inlet conduit prior to admission thereof into said charging conduit; first vaporizing means communicating with said third inlet conduit downstream of said first flow meter and said first preheater for vaporizing said substance prior to admission thereof into said charging conduit; a first admitting conduit for the admission of said substance into said first vaporizing means; a first collecting vessel communicating with said first vaporizing means for collecting unvaporized quantities of said substance; a second flow meter communicating with said fourth inlet conduit for measuring the quantity of inert gas flowing through said fourth inlet conduit; a second preheater communicating with said fourth inlet conduit for preheating the inert gas flowing said fourth inlet conduit prior to admission thereof into said second connecting conduit; second vaporizing means communicating with said fourth inlet conduit downstream of said second flow meter and said second preheater for vaporizing said substance prior to admission thereof into said second connecting conduit; a second admitting conduit for the admission of said substance into said second vaporizing means; and a second collecting vessel communicating with said second vaporizing means for collecting unvaporized quantities of said substance.

4,022,153

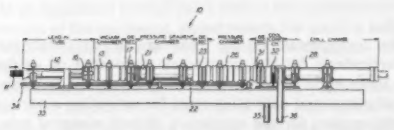
APPARATUS FOR SEALING A CABLE CORE WITH WATERPROOFING COMPOUND

Robert Wayne Rake, Phoenix; Albert Sanford Tingley, and Thomas Arthur Walter, both of Glendale, all of Ariz., assignors to Western Electric Company, Inc., New York, N.Y.

Division of Ser. No. 446,056, Feb. 26, 1974, abandoned. This application Sept. 19, 1975, Ser. No. 615,022

Int. Cl.² B05C *3/15, 11/04*

U.S. Cl. 118—68 **5 Claims**



1. An apparatus for applying a waterproofing compound to a cable core consisting of a plurality of stranded conductors having interstics therebetween, which comprises:

at least first and second chambers for receiving the waterproofing compound;

means for maintaining a portion of said compound in a substantially viscous state;

means for applying said portion of said compound in said substantially viscous state under pressure above atmospheric to successive portions of the advancing cable core to impregnate the same;

means for maintaining additional of said compound in a substantially more viscous state than said previous compound;

means for applying said additional compound in said second chamber over said previous compound while still viscous in said substantially more viscous state than said previous compound under pressure above atmosphere into contact with successive portions of the advancing impregnated cable core to coat, fill any voids and seal said previous viscous compound from said first chamber therein; and

means for cooling the advancing cable core subsequent to both applications of compound to substantially solidify the applied compounds.

4,022,154

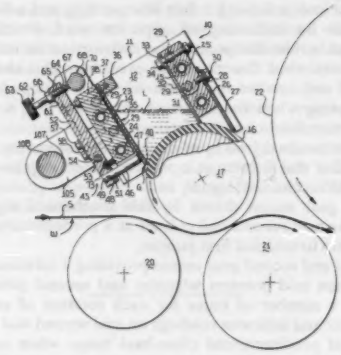
APPARATUS FOR CLEANING A DOCTOR BLADE

Kenneth K. Christensen, Winfield, and Charles A. Uncapher, Worth, both of Ill., assignors to Continental Can Company, Chicago, Ill.

Filed June 11, 1975, Ser. No. 585,858

Int. Cl.² B05C *1/08*

U.S. Cl. 118—261 **4 Claims**



1. Apparatus for periodically purging contaminants from a coating liquid during a coating operation comprising a container for housing a coating liquid, said container including an opening, a rotatable transfer roll contiguous said opening upon a surface of which the coating liquid is deposited, an elongated doctor blade having a free terminal edge, the longitudinal axis of said doctor blade being disposed generally parallel to the axis of rotation of said transfer roll, said doctor blade edge and transfer roll surface defining an exit gap of a predetermined size whereby the deposited coating liquid is doctored to a desired thickness during the passage of said transfer roll surface past doctor blade edge, means for rotating said transfer roll to move said transfer roll surface past said doctor blade edge, means for periodically increasing the predetermined size of said gap and returning the increased gap size to the predetermined size whereby contaminants otherwise incapable of passing through said gap when of said predetermined size will pass through said gap when of said increased size, means for selectively adjusting the predetermined size of said gap, said gap size increasing means includes means for effecting movement of said free terminal edge away from said transfer roll surface to produce said increased gap size, said movement effecting means including pivotally mounted arm means having opposite ends, one of said arm means ends being in contact with said doctor blade, movable cam means operative through another of said arm means ends to pivot said arm means for varying the size of said gap upon deflection of said

doctor blade and said gap adjusting means is carried by said one arm means opposite end.

4,022,155

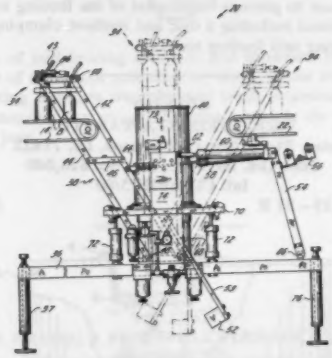
GLASSWARE COATING APPARATUS

Edward R. Campagna; Donald F. Hardy, both of Horseheads; Thomas W. Palmer, III; Barney R. Daugherty, both of Elmira Heights, and John R. Letawa, Horseheads, all of N.Y., assignors to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 232,455, March 7, 1972, Pat. No. 3,856,498. This application Oct. 16, 1974, Ser. No. 515,277

Int. Cl.² B05C *3/00*, *19/02*

U.S. Cl. 118—423 2 Claims



1. Coating apparatus adapted for intermittent operation in handling a plurality of individual articles and comprising:

a main supporting frame;

a container positioned upon said frame and having a porous support member which retains a particulate coating material thereabove including means in communication therewith to fluidize said particulate material;

a transfer mechanism attached to said frame for intermittent movement to a plurality of positions at least one of which is in juxtaposition with said container;

a gripper device carried by said transfer mechanism for gripping said articles and securely holding same during the movement of the transfer mechanism to its said plurality of positions, said transfer mechanism including support bar means pivoted proximate one end thereof and connected to said gripper device proximate an opposing end, said support bar means being connected to a drive means for effecting said intermittent movement; and

means to move said container into close communication with an article when the transfer mechanism is in juxtaposition with said container whereby the articles held by said gripper device come into contact with said particulate coating material.

4,022,156

WORK HOLDING DEVICE

Theodore C. Esterline, Erie, Pa., assignor to Mafix, Inc., Erie, Pa.

Filed Sept. 17, 1975, Ser. No. 614,171

Int. Cl.² B05C *15/00*, *17/08*, *13/00*

U.S. Cl. 118—504 4 Claims

1. A work support comprising a fixed frame comprising,

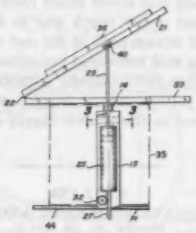
a horizontal frame member and vertically extending frame members fixed to said horizontal frame member extending upwardly therefrom,

horizontally-spaced, vertically extending movable columns, vertically-spaced lugs attached to said vertically-extending frame members and bearing means on said lugs slidably receiving said movable columns,

a movable work support frame attached to said columns and movable upwardly and downwardly therewith,

and means supported on said fixed frame urging said movable columns upwardly,

a mask holder hinged to said work support frame at one edge and swingable upwardly and downwardly relative thereto,



spaced hydraulic cylinders supported on said vertically extending frame members,

said cylinders each having a piston rod connected to said mask holder whereby said movable work support frame and said mask holder are moved upwardly a first distance away from said work,

and then said mask support frame is swung from said movable frame.

4,022,157

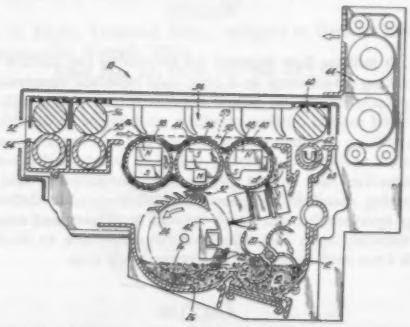
MAGNETIC BRUSH DEVELOPER EQUIPPED WITH SELF-METERING CONTROLS

Houshang Rasekhi, Warrensville Heights, and Philip Owen Shemkunas, Mentor, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 4, 1975, Ser. No. 601,287

Int. Cl.² B05B *5/00*; G03G *15/09*

U.S. Cl. 118—658 7 Claims



1. In a magnetic brush developing device adapted to have a controlled height of brush formation including a source supply of pulverulent developer mix made up of magnetically attractable carrier particles and toner particles, comprising:

a rotatably mounted metering drum partially immersed in said source supply, said metering drum having formed on its outer surface means for attracting and holding thereon a predetermined capacity for carrying measured quantities of said developer mix;

magnetic brush developer means comprising a plurality of rotatably mounted tubular structures in parallel axial alignment with one another forming a lower reach and upper reach respectively along the underside and upper

surface of said tubular structures, and said tubular structures having magnetic flux generating means disposed therein so as to form a flux field along said lower and upper reaches of said tubular structures establishing a fixed stream path for said developer mix having a starting point and a termination point, said metering drum being positioned adjacent said lower reach defining the starting point of said stream path and said magnetic flux means within said tubular structures effective to move the developer mix along said lower reach from said starting point and along said upper reach and to form a terminating point for said stream path at the end of said upper reach so as to bring said measured quantities of developer mix within the flux field thereby establishing a developer brush of a predetermined height, said developer mix being returned to the source supply at said terminating point.

4,022,158

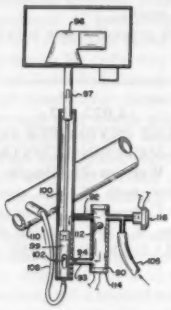
AUTOMATED MILKING ASSEMBLY

Andrew J. Flocchini, 7050 Lakeville Highway, Petaluma, Calif. 94952

Division of Ser. No. 510,328, Sept. 30, 1974, Pat. No. 3,973,520. This application Jan. 30, 1976, Ser. No. 653,818

Int. Cl.² A01J *7/00*

U.S. Cl. 119—14.14 **4 Claims**



1. A milking flow detector for measuring the outflow from a milking attachment to a cow, said detector comprising: a receptacle having an inflow conduit for receiving milk and first and second outflow conduits, said inflow communicated to a milking attachment to said cow, said first outflow communicated to a milk receiving manifold substantially without obstruction, said second outflow communicated to said milk receiving manifold, said second outflow conduit defining a large aperture through which the milk must pass; and means to periodically open and close said large aperture to discharge milk from said receptacle at a preselected rate.

4,022,159

SHIPPING CAGE FOR FEEDING ANIMALS WATER FROM DISPOSABLE BAGS

Matthew Salvia, Coldspring Road, Standfordville, N.Y. 12581

Continuation-in-part of Ser. No. 517,509, Oct. 24, 1974, Pat. No. 3,958,535. This application Nov. 17, 1975, Ser. No. 632,626

Int. Cl.² A01K *7/00*

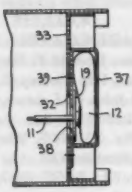
U.S. Cl. 119—19 **6 Claims**

1. A shipping cage for feeding animals liquids while in transport comprising a bottom, side walls and a cover,

receptacle means secured to the exterior of one of said side walls,

a sealed plastic container of liquid within said receptacle means,

a feeding means extending through an opening in said exterior wall and having a demand feeding valve at one end and a piercing point at the other end impaled within said container,



and means to prevent withdrawal of the feeding means by an animal including a disc and resilient clamping means engaging said feeding means.

4,022,160

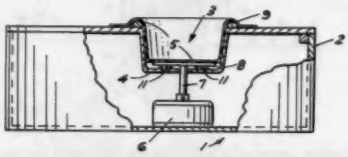
FROG FEEDING APPARATUS

Dozier Lester, Rte. 1, Box 156F, Duson, La. 71422

Filed Oct. 28, 1975, Ser. No. 626,040

Int. Cl.² A01K *5/00*

U.S. Cl. 119—51 R **3 Claims**



1. A frog feeding apparatus comprising:

a. a box member having a bottom wall, side walls and a top wall, the top wall being provided with a cylindrically shaped depression means having side walls depending from the top wall and a base member,

b. a flexible liner fitted in and lining the depression means,

c. and agitator means positioned within the box including a motor with a drive shaft extending through the base member of the depression means with an agitator member on an end of the drive shaft above the base member and below the flexible liner, whereby rotation of the agitator member imparts movement of frog food within the flexible liner.

4,022,161

RESTRAINING DEVICE FOR DOGS AND OTHER ANIMALS

Abraham Halperin, 102-36 64th Ave., Forest Hills, N.Y. 11375

Continuation-in-part of Ser. No. 542,501, Jan. 20, 1975, Pat. No. 3,974,800. This application June 1, 1976, Ser. No. 691,715

Int. Cl.² A01K *27/00*

U.S. Cl. 119—96 **7 Claims**

1. A restraining device for an animal, comprising:

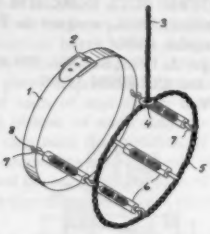
a flexible strap fastenable around an animal's neck near its body, said strap being provided with a plurality of holes distributed over substantially half its circumference;

a plurality of transversely separated rigid bracing elements secured to said strap, said elements having first and second hooks at opposite ends, said first hooks engaging in said holes;

a flexible leash extension anchored to said bracing elements at a predetermined distance from said strap substantially corresponding to the length of the animal's neck whereby said leash extension comes to lie close to the animal's jaws upon a fitting of the strap to its neck, said leash

extension having a plurality of apertures, said second hooks engaging in certain of said apertures opposite said holes; and

an eye fastened to a free end of said leash extension on one



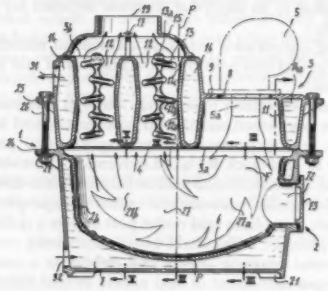
side of said bracing elements and traversed by another part of said leash extension on the opposite side of said bracing elements whereby said leash extension forms a tightenable loop about the animal's neck in the vicinity of the jaws.

4,022,162

BOILER HAVING A SEPARABLE FURNACE AND HEAT EXCHANGER

Jacques Escaro, Villemomble, and Maurice Chevalier, Bretigny sur Orge, both of France, assignors to Societe Generale de Fonderie, Paris, France

Filed Nov. 21, 1975, Ser. No. 634,153
Int. Cl.² F22B 7/12
U.S. Cl. 122—182 T 7 Claims



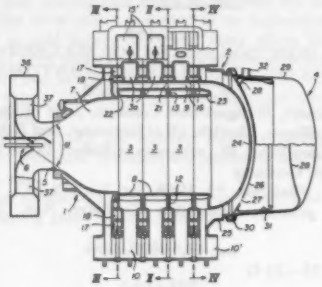
1. A boiler which is primarily intended for central heating and especially for the heating of individual apartments having low power requirements, said boiler being heated with gas or fuel-oil associated with a circulation of heat-transporting fluid and comprising a boiler furnace, a separable heat exchanger and a burner, the boiler furnace having a completely open section and a jacket through which the heat-transporting fluid is circulated, said jacket surrounding the furnace except for said open section, the heat exchanger carrying the burner and being removably mounted in use on the boiler furnace so as to cover said open section of said boiler furnace, said heat exchange comprising a series of flues and a jacket containing said heat-transporting fluid and surrounding the flues, the flame of said burner being directed away from the heat exchanger and the burner being located off-center with respect to the heat exchanger and the boiler furnace.

4,022,163

BOILER USING COMBUSTIBLE FLUID

Henri Baumgartner, Bernex, Geneva, and John Meier, Geneva, both of Switzerland, assignors to Pietro Fascione, Italy

Filed July 3, 1974, Ser. No. 485,621
Claims priority, application Switzerland, July 11, 1973, 10085/73
Int. Cl.² F22B 7/00, 25/00
U.S. Cl. 122—225 R 6 Claims



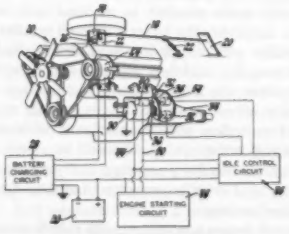
1. A fluid fuel boiler comprising, a combustion chamber having sidewalls, a cover on said combustion chamber having an opening for introducing a combustion supporting gaseous fluid through said opening, a burner for introducing a fluid fuel into the chamber mixed with said gaseous fluid for combustion thereof, and means defining said combustion chamber having means defining circumferentially of said combustion chamber a plurality of axial hot gas flow paths for receiving hot gases from a downstream portion of said combustion chamber to flow hot gases as jets into an upstream portion of said combustion chamber adjacent the start of said combustion chamber in a direction toward said downstream portion and adjacent said sidewalls.

4,022,164

ELECTRIC IDLE FOR INTERNAL COMBUSTION ENGINE

John R. Fuchs, Leawood, Kans., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 28, 1976, Ser. No. 652,905
Int. Cl.² F02B 75/12
U.S. Cl. 123—1 R 1 Claim



1. In a motor vehicle propelled by an internal combustion engine

a carburetor controlled by a throttle value means for supplying fuel and air to the engine, the throttle valve means being biased to a fully closed position and effective when closed to prevent air flow and fuel flow through the carburetor,

a battery energized starter motor manually enabled for engagement through a starter gear and an engine drive gear to crank the engine during engine starting,

means responsive to engine speed to detect an engine idle speed and to energize the starter motor during engine idle,

means for sensing starter motor speed and comparing that speed with engine speed to determine gear synchronism of the engine drive gear and the starter gear, and

means effective when gear synchronism is attained for engaging the starter gear with the engine drive gear whereby the engine is continuously rotated by the starter motor when the throttle valve means is fully closed.

4,022,165

FUEL INJECTION SYSTEM FOR SUCCESSIVELY INTRODUCING MULTIPLE FUEL QUANTITIES IN AN ENGINE CYLINDER

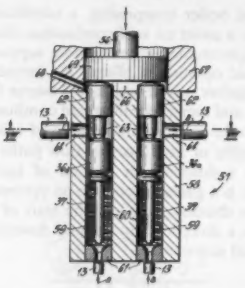
Konrad Eckert, Stuttgart-Bad Canstatt; Josef Steiner, Korb; Klaus Zeilinger, Munich, all of Germany, and Helmut Eidtmann, Glen Ellyn, Ill., assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 13, 1969, Ser. No. 876,312

Claims priority, application Germany, Nov. 13, 1968, 1808650

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 G **3 Claims**



1. In a fuel injection system for multicylinder internal combustion engines, said system being of the known type that supplies at least one engine cylinder within one working cycle thereof with a larger or main fuel quantity and with a smaller or ignition fuel quantity, the injection of the two quantities occurring separately in time, said system including (A) a fuel injection pump, (B) at least one main conduit connecting said pump with at least one first engine cylinder to supply the latter with said larger fuel quantity, (C) an auxiliary conduit extending from said main conduit to at least one second engine cylinder for supplying the latter with said smaller fuel quantity simultaneously with supplying said first cylinder with said larger fuel quantity, said first and said second cylinder operating out of phase, the improvement comprising:

a. injection means associated with at least one cylinder;

b. a fuel metering piston associated with each injection means and reciprocably disposed in a bore communicating with an auxiliary conduit carrying said smaller fuel quantity and with a pressure chamber disposed in said injection means;

c. abutment means associated with said fuel metering piston for determining the stroke thereof;

d. a spring in engagement with said fuel metering piston, said fuel metering piston displaceable against the force of said spring by the pressure of fuel admitted from said fuel injection pump, said fuel metering piston determining the amount of said smaller fuel quantity; and

e. a control apparatus containing a plurality of said bores in a parallel arrangement and an abutment means engageable by each fuel metering piston for determining the position of rest thereof, said abutment means is displaceable with respect to said fuel metering pistons to vary the stroke thereof for changing the amount of said smaller fuel quantity.

4,022,166

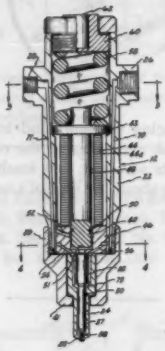
PIEZOELECTRIC FUEL INJECTOR VALVE

Hans U. Bart, Whitehall, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Apr. 3, 1975, Ser. No. 509,892

Int. Cl.² F02M *51/06*

U.S. Cl. 123—32 JV **3 Claims**



1. A liquid fuel injector valve for an internal combustion engine, said valve comprising:

a. a generally cylindrical valve body adapted to contain liquid fuel therein under pressure, said valve body having a liquid fuel inlet port and a liquid fuel outlet port;

b. a valve needle movable axially between a first position where said needle closes said outlet port and a second position where said outlet port is open;

c. a piezoelectric element in the form of a stack of coaxial piezoelectric discs cooperative with said needle for effecting movement of said needle to said second position in response to an electrical potential imposed across said element;

d. a spring cooperative with said element to maintain said needle in said first position in the absence of said imposed potential;

e. an axially extending passageway through said stack;

f. a piston positioned within said passageway and having a portion in engagement with said spring, said piston attached to said stack for axial movement therewith; and

g. a liquid chamber positioned axially between said piston and said needle wherein movement of said piston in a direction away from said outlet port effects a reduction in liquid pressure within said chamber thereby creating a differential pressure across said needle in a manner to effect said movement of said needle to said second position.

4,022,167

INTERNAL COMBUSTION ENGINE AND OPERATING CYCLE

Haakon Henrik Kristiansen, 484 Bedson Street, Winnipeg, Manitoba, Canada

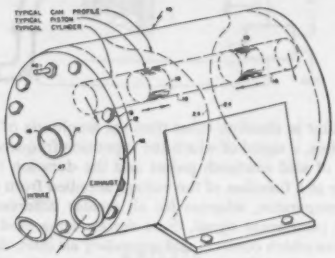
Continuation-in-part of Ser. No. 433,237, Jan. 14, 1974, abandoned. This application Feb. 4, 1975, Ser. No. 546,909

Int. Cl.² F02B *57/00*

U.S. Cl. 123—43 AA **13 Claims**

1. An internal combustion engine comprising, in combination, a hollow cylindrical stator including bearing plates located at each end thereof and a common cylinder head located intermediate the ends thereof to thereby define a first and second cylindrical chambers therein; ignition means lo-

cated in said cylinder head; fuel and air inlet means and exhaust means located in said common cylinder head; first and second rotor members respectively disposed within said first and second stator chambers; means for journalling said rotors for rotation within the respective stator chambers; a cam ring for each said rotor mounted at one end of each of said stator chambers; said rotor means each comprising means defining a plurality of cylindrical bores having the axes thereof parallel to the axis of that rotor and disposed annularly around the axis of that rotor; a piston disposed for reciprocal motion in each of said bores of each of said rotors; means for operatively connecting said pistons of each rotor to the profile of the respective cam ring such that rotation of said rotors causes rotation of said connecting means around said cam ring profile to thereby control the reciprocal motion of said pistons within said bores; and a common combustion chamber formed in said



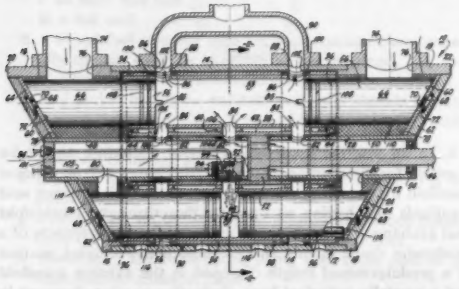
common cylinder head so as to brought into operative axial alignment with successive ones of the bores in both of said rotors during the rotation of said rotors, said common combustion chamber extending through said cylinder head with the axis thereof parallel to the axes of said rotors to provide direct permanent communication from one side thereof to the other and communicating with opposing bores of said rotors when brought to axial alignment therewith so as to provide simultaneous, common combustion between the pistons of said opposing bores, said common combustion chamber being operatively connected to said ignition means and being of such radial extent as to at least intermittently overlap two adjacent bores during rotation of said rotor thereby providing continuous combustion said air inlet means and said exhaust means being sequentially and operatively connected to said opposing bores from said common cylinder head.

4,022,168

TWO-CYCLE ROTARY-RECIPROCAL-ENGINE

John S. Sprague, Pacific Marina No. 808, Alameda, Calif. 94501

Filed Sept. 11, 1975, Ser. No. 612,637
Int. Cl.² F02B *57/06*
U.S. Cl. 123—43 A **20 Claims**



1. A two-cycle reciprocal, rotary, internal combustion engine comprising:

a. a central supply core defining a central engine axis;

b. a plurality of piston cylinders mounted symmetrically around said central engine axis, each cylinder having an axis parallel to said central axis, said piston cylinders being rotatable as a unit around said supply core on said central axis;

c. a plurality of pistons, two pistons being slidably mounted in each of said piston cylinders, each pair of pistons having first ends oppositely facing defining a chamber within each of said cylinders and second ends with a contact face, said contact face being an inclined flat face;

d. two flat drive plates mounted at an inclination with respect to said supply core, said drive plates being tilted toward each other in equilateral trapezoidal fashion, said contact end faces of said pistons interfacing said inclined drive plates, and being coplanar and slidably engageable therewith;

e. two cycle intake and exhaust means cooperatively arranged with said cylinders for admitting and exhausting gases; and,

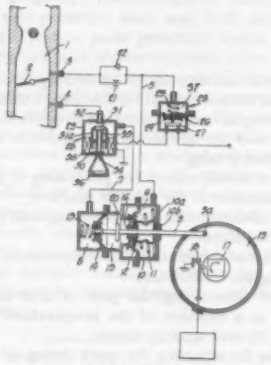
f. ignition means cooperatively arranged with said cylinders for igniting gases in said cylinders.

4,022,169

CONTROL SYSTEM FOR ENGINE IGNITION TIMING

Minoru Tanaka, Chofu; Yoshio Tanaka, Tokyo, and Akio Nagai, Kawagoe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 6, 1975, Ser. No. 602,435
Claims priority, application Japan, Aug. 9, 1974, 49-90746
Int. Cl.² F02P *5/02*
U.S. Cl. 123—117 A **5 Claims**



1. In an internal combustion engine having a throttle valve positioned in an intake passage, ignition timing control apparatus comprising, in combination: a first vacuum outlet communicating with the intake passage near the throttle valve and upstream therefrom, a second vacuum outlet communicating with the intake passage downstream from the throttle valve, a first vacuum chamber having a movable element, a first passage connecting said first vacuum outlet to said first vacuum chamber, said first passage having a check valve permitting flow toward said first vacuum chamber and having orifice means in parallel with said check valve to restrict flow through said first passage in the other direction, a second vacuum chamber, means including control means for retarding the ignition timing of the engine in accordance with increase of vacuum intensity in said second vacuum chamber, a second passage connecting said second vacuum outlet to said second vacuum chamber, a selector valve assembly operatively interposed in said second passage, said selector valve assembly having a valve body movable from a first position in which said second vacuum chamber is connected to said second vacuum outlet to a second position in which said second vacuum

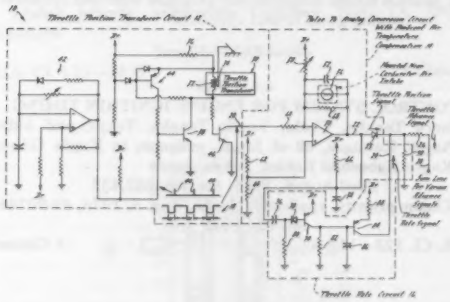
chamber is connected to atmosphere, means responsive to increase of vacuum intensity downstream from said orifice means in said first passage for causing said valve body of said selector first position to said second position, and cooperating means on said control means engageable with said movable element of said first vacuum chamber for limiting the extent of movement of said control means in a direction to advance the ignition timing.

4,022,170

CIRCUIT FOR GENERATING A TEMPERATURE COMPENSATED THROTTLE ADVANCE SIGNAL HAVING POSITION AND RATE COMPONENTS

Frederick William Crall, Farmington, and LaVerne Andrew Caron, Sterling Heights, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 22, 1975, Ser. No. 570,934
Int. Cl.² F02P 5/04; F02B 3/00
U.S. Cl. 123—117 R **15 Claims**



1. A throttle advance signal generating circuit for generating a throttle advance signal representing a controlled amount of spark timing advance in response to operation of a carburetor throttle and the temperature of ambient air entering the carburetor comprising:

transducer circuit means for generating a pulse waveform representative of the throttle position;

amplifier circuit means for converting said pulse waveform into an analog signal;

sensing means for sensing the temperature of ambient air entering the carburetor;

means for attenuating the gain of said amplifier circuit means as a function of the temperature of ambient air sensed by said sensing means;

and means for adjusting the spark timing advance in accordance with said analog signal whereby said throttle advance signal is provided by said analog signal.

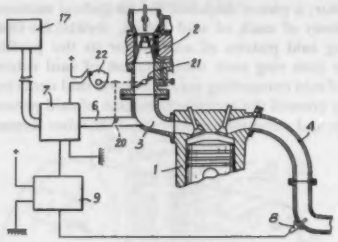
4,022,171

PROCESS AND DEVICE FOR CONTROLLING AN ELECTRIC VALVE FOR REGULATING THE SUPPLY OF THE FUEL AIR MIXTURE TO INTERNAL COMBUSTION ENGINES

Bernard Laprade; Xavier Laprada, both of 64 260 Arudy, and Pierre Gele, 3, rue Vaussenat, 65 000 Tarbes, all of France

Filed May 19, 1975, Ser. No. 578,987
Claims priority, application France, May 24, 1974, 74.18028
Int. Cl.² F02B 75/10, 3/00; F02M 37/00
U.S. Cl. 123—119 EC **16 Claims**

8. In a device for regulating the composition of a fuel air mixture fed to an internal combustion engine, comprising a secondary air inlet duct opening into the intake pipe and controlled by a valve which is controlled in response to information supplied from a detector situated in the exhaust pipe and measuring the composition of the exhaust gas, the improvement comprising a source of stabilized voltage, a difference amplifying comparator which provides a voltage proportional to the difference between said stabilized voltage and a signal from said detector, a pulse generator which generates triangular pulses of constant amplitude and frequency, a comparator which receives the voltage supplied from said difference amplifying comparator and said triangular pulses, which comparator produces, for all the amplified differences which



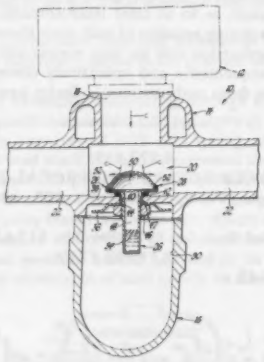
are smaller in absolute value than the amplitude of the triangular pulses, a signal of which the repetition frequency is equal to that of said sawtooth pulses and the duration of which is variable as a function of the voltage supplied from said difference comparator, whereas for all greater differences it produces a permanent signal, these signals being used to control said valve which controls said secondary air inlet, the duration of said signals defining the time of opening of said valve.

4,022,172

MANIFOLD HEAT EXCHANGER

Max Fingeroot, Oak Park, Mich., assignor to American Motors Corporation, Detroit, Mich.

Filed Dec. 29, 1975, Ser. No. 644,676
Int. Cl.² F02M 31/00
U.S. Cl. 123—122 AC **13 Claims**



1. In an internal combustion engine including an intake manifold for distributing a combustible charge and an exhaust manifold for receiving exhaust gases, and a wall between said manifolds and having an opening therethrough, a manifold heat exchanger comprising: an enclosed liquid receptacle of a mushroom shape having an elongated heat receiving portion of a predetermined length disposed in the exhaust manifold and a partially spherical heat dissipating portion disposed in the intake manifold; said heat receiving portion of the receptacle extending through said manifold wall opening and having

a cross section of a smaller size than the diameter of the partially spherical heat dissipating portion thereof; and a quantity of liquid received within and partially filling the receptacle, the liquid within the receptacle being vaporized by heat from exhaust gases flowing through the exhaust manifold over the predetermined length of the elongated heat receiving portion of the receptacle, and the vaporized liquid transferring heat to the partially spherical heat dissipating portion of the receptacle so as to heat the combustible charge as the charge impinges with the partially spherical shape thereof within the intake manifold.

4,022,173

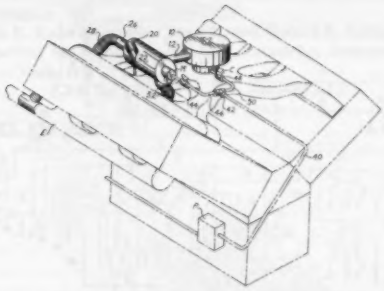
CROSS-FLOW VAPORIZER

Frank E. Read, 702 Vardo Lane, Lubbock, Tex. 79403

Filed Aug. 11, 1975, Ser. No. 603,589

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **17 Claims**



1. A fuel vaporizer for a spark ignition internal combustion engine comprising:

a. a cylindrical horizontal vaporization chamber, said chamber having

i. an inlet end and

ii. a hot end,

b. a liquid fuel opening into the vaporization chamber axially aligned with the chamber at the inlet end,

c. a cylindrical jacket around the vaporization chamber,

d. said jacket having an exhaust heat inlet therein directed toward the axis of the hot end of the vaporization chamber,

e. said jacket having an exhaust outlet therefrom

f. a liquid drain from the vaporization chamber at a low point therein,

g. a cylindrical vapor outlet pipe whose top extends tangentially from the top of the vaporization chamber

h. the axis of the outlet pipe being above the axis of the vaporization chamber, and

i. a cylindrical air intake pipe whose bottom extends tangentially from the vaporization chamber.

4,022,174

ELECTROMAGNETICALLY ACTUATED PUMPS

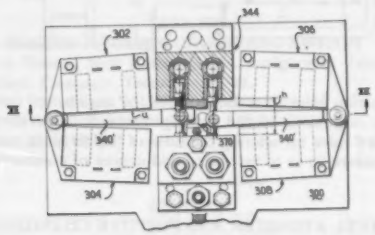
Willem Brinkman, Velp, Netherlands, assignor to Holec, N.V., Hengelo, Netherlands

Continuation in-part of Ser. No. 452,549, March 19, 1974, and Ser. No. 452,619, March 19, 1974. This application Mar. 21, 1975, Ser. No. 560,771

Claims priority, application Netherlands, Mar. 22, 1974, 7403918; Mar. 22, 1974, 7403916; Mar. 22, 1974, 7403915; Mar. 22, 1974, 7403914; Mar. 22, 1974, 7403913; Mar. 22, 1974, 7403917; Aug. 13, 1974, 7410855; July 11, 1974, 7409428

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 E **20 Claims**



1. In an automotive power plant, the combination of:

an internal combustion engine having an intake manifold;

a fuel injection system comprising at least two positive displacement pumps and a common actuator for said pumps, said common actuator being in the form of a plate-like armature, electromagnetic drive means for shuttling said armature back and forth sequentially to actuate said pumps, pulse generator means for periodically energizing said electromagnetic drive means, and first and second stop means for positively and substantially instantaneously terminating the movements of said armature to delinete the end points of its back and forth movements, said stop means being constituted by a pair of rigid members disposed in spaced relation so that the spacing fixes said end points of armature movements correspondingly to fix the strokes of said pumps, at least said first stop means being movable to change said spacing and thereby alter the strokes of said pumps; and

control means connected to said intake manifold and responsive to pressure variations therein for moving said first stop means to vary said spacing and the strokes of said pumps.

4,022,175

CARBURETTOR FOR AN INTERNAL COMBUSTION ENGINE

Bernard Laprade; Xavier Laprade, both of Arudy, and Pierre Gelé, Laloubere, all of France, assignors to Les Usines Laprade and Societe Nationale des Petroles d'Aquitaine, France

Filed Jan. 15, 1975, Ser. No. 541,252

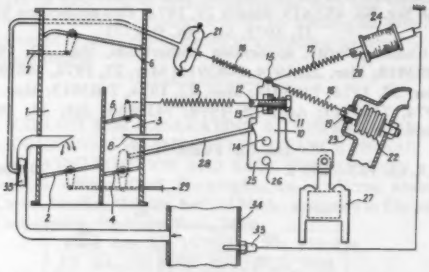
Claims priority, application France, Jan. 21, 1974, 74.01885

Int. Cl.³ F02B *3/00, 75/10*

U.S. Cl. 123—140 MC **4 Claims**

1. In combination a carburettor and internal combustion engine which has an inlet for a combustible fuel/air mixture and an outlet for combustion gases produced from said mixture, the carburettor comprising a body having an air inlet, a main duct and an auxiliary duct leading from said inlet, each of said ducts including a main valve for controlling the flow of air therethrough, a fuel supply tube for supplying fuel into said auxiliary duct upstream of the main valve in the auxiliary duct, a further valve in said inlet upstream of both said ducts for controlling the supply of air into said ducts, means for mixing the fluid leaving said ducts to form a fuel/air mixture to be

applied to the inlet of the engine, an auxiliary valve positioned in said auxiliary inlet upstream of said fuel supply tube, sensing means responsive to the degree of combustion of the



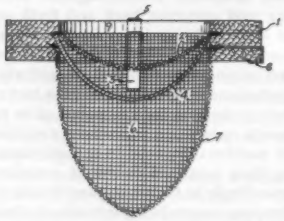
combustion gases from the outlet of the engine, and operative means responsive to the sensing means for operating said auxiliary valve for altering the ratio of fuel to air in said fuel-/air mixture so as to maximize said degree of combustion.

4,022,176

FUEL ATOMIZER AND POSITIVE CHARGING GENERATOR

Arthur Edwin Taylor, 912 Girard Drive, Louisville, Ky. 40222

Filed June 9, 1975, Ser. No. 563,347
Int. Cl.² F02M *29/00*
U.S. Cl. 123—141 **1 Claim**



1. A fuel atomizer and positive charging generator in combination with an internal combustion engine having a carburetor and intake manifold, comprised of a laminated spacer

a primary shallow cup-shaped screen disposed within the said laminated spacer extending across circular venturi opening and grounded to chassis through a metal contact,

a first baffle disposed within the laminated spacer and extending from one side of venturi opening curved under the primary screen and continuing to the opposite side of the venturi opening and grounded to the chassis through a metal contact,

a second baffle disposed within said laminated spacer extending from one side of the venturi opening at right angles to the first baffle and curved to pass under the primary screen and first baffle and separating from the first baffle at the point where they cross, and grounded to the chassis through a metal contact,

an expansion chamber formed by the outer extremities of secondary screen to allow the fuel mixture to expand and lower in temperature,

a secondary cone-shaped screen disposed in the laminated spacer formed in a deep cone-shape to form the outer extremities of the expansion chamber and further atomize and positive charge the fuel mixture the secondary screen is grounded to the intake manifold through a separate metal contact,

said primary screen being composed of a non-ferrous alloy with a suitable mesh to allow the flow of the fuel mixture without restriction, and atomize the droplets of fuel the primary screen being shallow cup-shaped to increase the mesh area, and eliminate the restriction of the fuel mixture, said primary screen is grounded to the chassis through the base of carburetor,

said first and second baffles being composed of a non-ferrous alloy dissimilar to the primary and secondary screen, functions to further atomize, create an eddy current, expand the mixture, and lower the temperature of the mixture said baffles are grounded to the carburetor base through a metal contact,

said expansion chamber to allow the expanded, lower temperature mixture to enter and further expand,

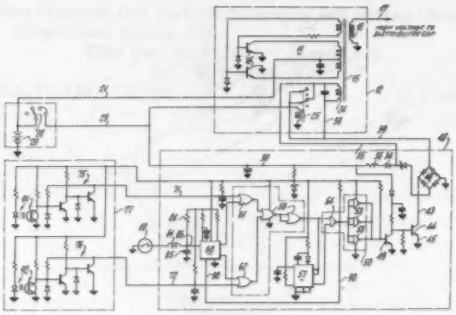
said secondary screen being composed of a non-ferrous alloy with a suitable mesh to allow the flow of the fuel mixture without restriction, and grounded separately to the chassis of the vehicle through a metal contact contacting intake manifold the secondary screen further atomizes the fuel mixture and generates a positive charge.

4,022,177

CONTROLLED SPARK DURATION IGNITION SYSTEM

Robert E. Canup, Chester, Va., and Clifford H. Faist, Monsey, N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,676
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 CB **4 Claims**



1. In combination with a controlled-spark-duration ignition system for an interval combustion engine, said system having a high-frequency continuous-wave oscillator including a transformer having a high-voltage output winding adapted for connection to a sparking circuit, an oscillator control winding on said transformer for starting and stopping oscillation, and electronic switch means comprising a transistor connected in series with said oscillator control winding and trigger means for switching said transistor from conducting to non-conducting state and back,

the improvement comprising a pair of photo electric sensors mounted diametrically apart on the distributor of said engine and having different ignition timing angles.relative to said engine crank shaft,

a pair of electronic gates,

an engine load condition activated switch,

an electronic flip-flop for controlling which of said gates is open.

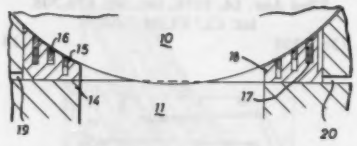
said sensors being each connected to one of said gates,

means for connecting the output of said gates to said trigger means.

4,022,178
VALVES

Michael Ellison Cross, 52 Bloomfield Avenue, and Albert Edward Coles, 366 Bloomfield Road, both of Bath, England

Filed Sept. 6, 1974, Ser. No. 504,688
Claims priority, application United Kingdom, Sept. 7, 1973, 42105/73
Int. Cl.² F01L *7/00*
U.S. Cl. 123—190 E **5 Claims**

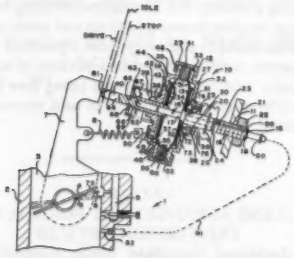


1. A rotary valve for controlling the flow of gases, which valve comprises a stationary valve housing defining an opening in a face thereof, and a movable valve member mounted for rotation within a bore defined by said housing, said valve member having a face slidable over said face of the housing and defining a port in its said face which comes into and out of communication with the said opening, means to supply lubricant between the two said faces, sealing means disposed to reduce the oil film thickness between the two said faces in the region of the port and opening when in communication to be from 40 to 50 μ inches, said sealing means comprising at least one sealing element provided around the opening in said face of the valve housing for sealing against the valve member, said sealing element comprising a spiral groove formed in said face.

4,022,179
VACUUM CONTROLLED THROTTLE POSITIONER AND DASHPOT

Ralph E. Kalert, Granite City, Ill., and Robert E. Schlage, St. Charles, Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,612
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 D **16 Claims**



1. A vacuum controlled throttle positioner and dash pot for regulating a carburetor of an internal combustion engine, comprising:

a dash pot stem having a first end and a second end, said dash pot stem having an axial opening extending at least partially through it, and a second opening extending radially through it, said radial opening communicating with said axial opening, said dash pot stem having a threaded portion along said first end;

a diaphragm housing movably mounted on said dash pot stem, said diaphragm housing defining a chamber;

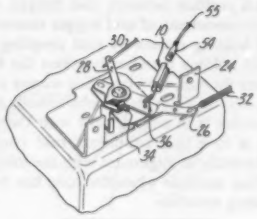
a first diaphragm assembly including a first flexible diaphragm mounted in said chamber and dividing said chamber into a first chamber part and a second chamber part, the radial opening in said dash pot stem communicating with said first chamber part, said first flexible diaphragm being attached to said valve stem; and

a second diaphragm assembly including a second flexible diaphragm movably mounted in said housing between at least a first position and a second position, said second diaphragm dividing said second chamber part into a third chamber part, a shaft mounted to said second diaphragm and movable therewith, said shaft having a first end extending through said housing and a second end having a receptacle formed in it, said receptacle being adapted to receive the second end of said dash pot stem, said second diaphragm assembly being movably mounted along the second end of said stem.

4,022,180
ENGINE IGNITION GROUNDING SWITCH

David J. Bosma, New Holstein, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Feb. 23, 1976, Ser. No. 660,167
Int. Cl.² F02B *77/00;* **A01D** *75/28*
U.S. Cl. 123—198 DC **11 Claims**

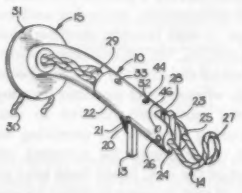


1. In combination with an internal combustion engine having an ignition system and a carburetor control lever connected to electrical ground and movable between on and off positions, a switch for grounding said ignition system when said lever is moved to said off position comprising an elongated block of electrical insulating material fixedly disposed adjacent said off position of said control lever and having a channel formed lengthwise therein opening toward said lever, and a wire shorting terminal electrically connected to said ignition system having an inner end fixedly disposed within said channel aperture and an outer end extending from said channel aperture in the direction of said lever such that said wire terminal makes electrical contact with said control lever as said lever is moved to said off position.

4,022,181
BOWSTRING DRAW AND TRIGGER RELEASE APPARATUS

James D. Fletcher, P.O. Box 218, Bodfish, Calif. 93205

Filed Sept. 2, 1975, Ser. No. 609,293
Int. Cl.² F41C *19/00*
U.S. Cl. 124—35 A **7 Claims**



1. A bowstring draw and release apparatus comprising:

a. a housing comprising a spine and a pair of flanges having

inner walls aligned in uniformly parallel spaced relation to one another, said flanges depending from said spine and defining a cavity between the inner walls of said flanges;

b. a bowstring draw cord secured intermediate said flanges of said housing and including a terminal loop, said bowstring draw corn being adapted to be disposed about and draw a bowstring;

c. a holding member pivotally secured between the inner walls of said flanges for movement between first and second positions for holding and releasing the terminal loop of said draw cord respectively whereby the bowstring will be respectively drawn and released;

d. trigger means for releasing the bowstring, said trigger means being pivotally coupled between the inner walls of said flanges in a planar relationship to said holding member and being moveable between first and second positions consistent with the first and second positions of said holding member; and

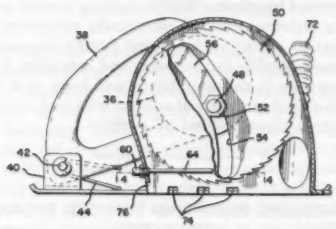
e. a coupling means for aiding oscillatiser of the holding member, said coupling means having first and second ends, the first and second ends of said coupling means being journeled to said trigger means and said holding member, at a position between said flanges, respectively, whereby the movement of said trigger means is transmitted to said holding means by said coupling member to oscillate said holding member between the first and second positions thereof, said coupling means engaging said holding member at an angle of substantially 90° when the holding member is in engagement with the loop when a bow string is in a taut condition, said coupling means being substantially in alignment with the longitudinal axis of the holding member when the loop has been released from a holding member.

4,022,182

DUST AND WATER CONFINEMENT UNIT FOR PORTABLE CIRCULAR SAW

Steve T. Lenkevich, 1723 Warren St., New Cumberland, Pa. 17070

Filed Jan. 12, 1976, Ser. No. 648,314
Int. Cl.² B28D *1/04*
U.S. Cl. 125—13 R **6 Claims**



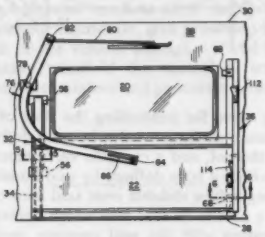
1. A dust and water confinement unit for a conventional circular saw, said saw having a handle portion and a circular cutting blade, said confinement unit comprising a rigid integral housing member having a generally circular configuration for receiving and substantially enclosing said cutting blade, a base plate secured to said housing member generally at right angles thereto, pivot means on said base plate for receiving said handle portion of the circular saw at a point remote from said cutting blade whereby the saw and housing member are capable of pivotal movement relative to each other, slot means in said housing member for receiving an arbor of the circular saw and cover means for covering said slot during cutting movement of the saw, liquid fluid inlet means disposed in an end surface of said housing member located nearest said pivot means and adjacent said base plate, spring biasing means for biasing said saw into said housing member away from said base plate, and a discharge tube extending from said housing member at a point adjacent said base plate and distant from said fluid means.

4,022,183

TRACK SYSTEM FOR OVEN WINDOW SHUTTER ON SELF CLEANING OVEN

Douglas Earl Martin, Mississauga, Canada, assignor to GSW Limited-GSW Limitee, Toronto, Canada

Filed Apr. 14, 1976, Ser. No. 676,705
Int. Cl.² F23M *7/00*
U.S. Cl. 126—200 **14 Claims**



1. In an oven door having a window with a transparent pane for use on an oven, said oven door including spaced-apart outer and inner door panels with aligned apertures which define a window opening, a moveable shield positioned between said outer and inner door panels which is adapted to be moved to a position to cover and to shield said transparent pane from thermal radiation generated by an oven operating at high temperatures and which is adapted to be moved to a position to uncover said transparent pane and leave said window opening unobstructed to permit viewing into an oven, a linear motion bearing means having a first end portion of said moveable shield mounted thereon, said linear motion bearing means being adapted to suspend said moveable shield by said first end portion within said oven door and essentially preclude transverse movement of said moveable shield, means for moving said moveable shield along said linear motion bearing means to a position which covers said transparent pane and for releasably holding said moveable shield in a transparent pane covering position, the arrangement being such that said linear motion bearing means positions and guide movement of said moveable shield to and away from a position which covers said transparent pane, a second end portion of said moveable shield opposite said first end portion being free from support means whereby thermal expansion in said moveable shield is accommodated.

4,022,184

LATERAL LENS ARRANGEMENT FOR SOLAR ENERGY CONVERSION DEVICES

Donald E. Anderson, Northfield, Minn., assignor to Sheldahl, Inc., Northfield, Minn.

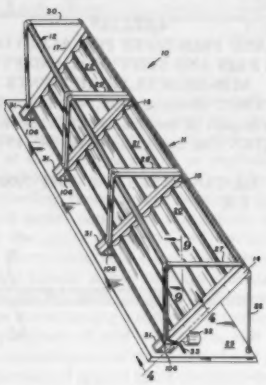
Filed Mar. 10, 1975, Ser. No. 556,650
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **20 Claims**

1. In a solar heat concentrator comprising, in combination, solar radiation concentrator means and radiation absorber means for receiving concentrated solar energy from said concentrator means;

a. said solar concentrator means comprising a plurality of generally parallelly disposed elongated reflector elements each element having a reflective surface and including means for controllably positioning each of said reflective surfaces in solar viewing and absorber reflecting disposition for accommodation of diurnal solar motion;

b. said radiation absorber means including an elongated generally cylindrical fluid transfer duct having a cylindri-

cal axis extending generally parallel to the elongated axis of each of said reflective surfaces, and with a generally closed peripheral surface, said peripheral surface being disposed about said cylindrical axis and having an arcuate portion defining an energy absorptive zone and an arcuate portion defining a thermally insulative zone, with said energy absorptive zone being disposed in generally opposed relationship to said reflective surface, and with the balance of the arcuate surface of said absorber comprising said insulative zone and being provided with a thermally insulative covering for substantially reducing the thermal energy losses therefrom, said fluid transfer duct being disposed along a plane generally at least as high as that of the uppermost of said elongated reflector elements.

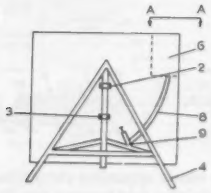


4,022,185

HEAT ACTUABLE DIRECTING DEVICE

Peter von Hartitzsch, 409 Jervois Street, Hastings, New Zealand

Filed July 28, 1975, Ser. No. 599,352
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **3 Claims**



1. A solar heat actuable directing device comprising a pivotally mounted member to be directed to a more favourable disposition with respect to the sun as the sun moves during the day time, said member having associated therewith solar energy collection means,

a fluid container in a constant relationship with said member to be directed,

shield means statically associated with said fluid container arranged to shield said container from said sun when said member to be directed is at its most favoured disposition with respect to the sun but which permits sunlight to reach said container when said member to be directed has fallen behind the movement of the sun,

fluid actuable ram means associated with said member to be directed capable of moving said member about its pivotal mounting from a less favoured disposition to a more favoured disposition with respect to said sun upon receiving an appropriate modified fluid pressure caused by changes in the amount of heat from the sun being received by said fluid container, and

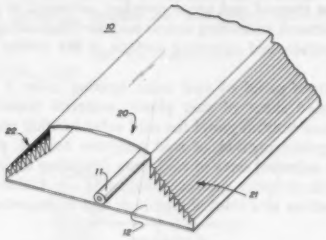
fluid tight conduit means operatively connected between said container and said fluid actuable ram means to convey fluid pressure changes from said container to said fluid actuable ram means.

4,022,186

COMPOUND LENS SOLAR ENERGY SYSTEM

Leonard L. Northrup, Jr., 4312 Westway, Dallas, Tex. 75205

Filed Sept. 10, 1975, Ser. No. 611,861
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **1 Claim**



1. A solar collector comprising:

an elongated heat exchange element onto which the sun's rays are to be directed,

a compound concentration lens system mounted to direct sun's rays onto said element and formed of a center refractor extending the length of said element to refract sun's rays onto the surface of said element facing the sun, and

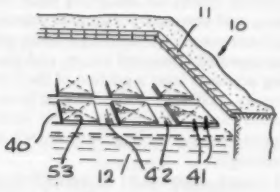
a pair of reflectors extending the length of said element, one on each side of said refractor, said reflectors each having a plurality of parallel prisms arranged one above the other for reflection of light onto the sides of said element.

4,022,187

FLOATING SOLAR HEATER FOR SWIMMING POOLS

Marvin A. Roberts, 6225 Melvin Ave., Reseda, Calif. 91335

Filed Nov. 24, 1975, Ser. No. 634,858
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271 **5 Claims**



1. A bouyant solar heating apparatus in combination with a pool for holding a body of water between opposite sidewalls and end-walls, comprising:

a plurality of separate individual solar heating units having a predetermined complimentary configuration for ar-

rangement about the surface of said body of water so that adjacent ones of said units contact each other at the periphery of said adjacent units;

each of said units having a top panel and a bottom panel of thin flexible plastic material and joined at their respective peripheral edges to define an ambient air-filled compatement between opposing surfaces of said panels;

said top panel being translucent and said bottom panel being opaque whereby the short rays of the sun pass through said top panel for absorption by said bottom panel and the longer rays emitted by said bottom panel are blocked by said top panel so that the short rays are readily converted to heat which is conducted to the surface of the body of water;

a rib structure carried on each of said solar heating units to maintain separation between said opposing surfaces of said panel so as to maintain definition of said air-filled compartment;

said rib structure consists of a rigid member extending about the periphery of each of said solar heating units and in connection therewith to separate said opposing surfaces of said panels immediately at the edge marginal regions thereof and cross member arranged in a frame-like network extending across said air-filled compartment to separate said opposing surface in the center thereof; and

said bottom panel of said solar heating units is a single elongated sheet of said plastic material constituting a common bottom panel for said solar heating panels and an exposed portion of said common bottom panel between adjacent ones of said units providing a hingable or foldable member whereby said units are folded over on themselves in a stack for storage and transportation.

4,022,188

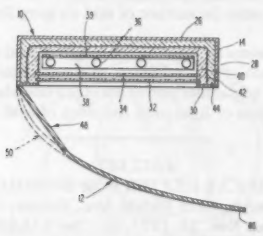
HIGH EFFICIENCY SOLAR COLLECTOR

Jeffrey M. Cohen, and Marion D. Cohen, both of 2201 Pennsylvania Ave., Philadelphia, Pa. 19130

Filed Apr. 5, 1976, Ser. No. 674,060

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **9 Claims**



1. A radiant solar energy collection apparatus for supressing convective loss, comprising:

a. an absorption means for absorbing solar radiation while minimizing said convective loss, said means comprising:

i. an insulated outer shell defining a substantially imperforate downwardly directed cavity and an aperture extending across at least a portion of the lower surface of said cavity, said shell comprising at least one layer of insulation means for insulating the entire surface of said cavity for preventing the transmission of energy therethrough;

ii. sheet means disposed to entirely close said aperture, for transmitting solar energy through said aperture; and

iii. an absorber means, disposed within said cavity spaced apart from said sheet means and surrounded on the top and all sides by said shell so that substantially all portions of said absorber are disposed above any substantial portion of said sheet means, for absorbing incident radiant energy transmitted through said sheet means to substantially prevent convective currents from developing between said absorber and said sheet means;

b. an elongate reflecting element disposed substantially beneath said absorption means for directing radiant solar energy upwardly through said sheet means and upon said absorber.

4,022,189

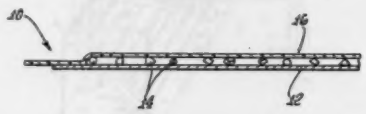
DEVICE AND PROCESSES FOR ALLEVIATION OF MUSCULAR PAIN AND STIFFNESS, AND SYMPTOMS OF NON-MUSCULAR AILMENTS

Steve Boxer, 13617 Sherman Way, Van Nuys, Calif. 91405

Continuation-in-part of Ser. No. 394,118, Sept. 4, 1973, Pat. No. 3,987,787. This application May 30, 1975, Ser. No. 582,303

Int. Cl.² A61M 37/00; A61F 7/02

U.S. Cl. 128—1 R **26 Claims**



1. A device for alleviating the symptoms of nonmuscular ailments and discomfort of a person's body, by applying said device to at least two body locations selected from the group consisting of body trigger points, motor points, reflex points, and acupuncture loci, without easily puncturing said person's skin, comprising:

a base material having non-medicated adhesive properties, and

at least one small rigid object affixed to one side of said base material, said object being located between said base material and the person's body location.

4,022,190

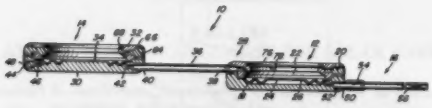
APPARATUS FOR SENSING PRESSURE

Glenn A. Meyer, Brookfield, Wis., assignor to Hittman Corporation, Columbia, Md.

Filed July 16, 1974, Ser. No. 489,000

Int. Cl.² A61B 5/00

U.S. Cl. 128—2 A **16 Claims**

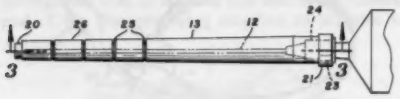


1. A fluid pressure sensor apparatus comprising a housing, a first resilient means dividing said housing into first and second chambers, fluid communication means for placing said first chamber in fluid communication with the fluid whose pressure is to be sensed so that the pressure of said fluid will cause said first resilient means to move, filter means associated with said fluid communication means for preventing particulate matter in said fluid from entering said first chamber, second resilient means in fluid communication with said second chamber, and a radioactive fluid contained within said second chamber and being in fluid communication with said second resilient means, said radioactive fluid being transferred from said second chamber as a function of the fluid pressure acting upon said first resilient means.

4,022,191
BIOPSY NEEDLE GUARD AND GUIDE

Khosrow Jamshidi, 610 Winston Court, St. Paul, Minn. 55118

Filed June 4, 1976, Ser. No. 692,632
Int. Cl.² A61B 5/00
U.S. Cl. 128—2 B 5 Claims



1. In combination with a biopsy specimen collecting needle having an aspirating chamber and a tubular needle coupled thereto at the proximal end of the needle, the needle having a sharpened tip at the distal end and an aspirating chamber receiving hub at the proximal end thereof, and having a shank with a bore extending therethrough disposed therebetween; and sleeve guard means coupled to said tubular needle along said hub, with the guard enclosing and encapsulating said tubular needle therewithin; said sleeve comprising:

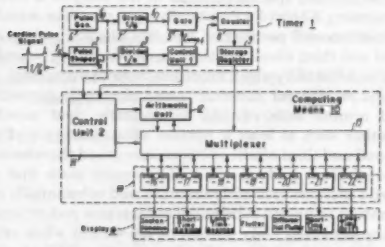
a. an elongated tubular sleeve having a closed base and an open top, with the inner periphery of the upper end of said tubular sleeve having a surface for sealingly engaging the outer periphery of said needle hub; and

b. the outer circumference of the shank of said sleeve guard having a plurality of spaced apart circumferential grooves formed therein and disposed along that portion of the length of said sleeve guard shank enclosing said tubular needle, said circular grooves forming spaced apart score lines of a depth sufficient to permit said sleeve shank to be broken along said score lines upon flexure thereof to form an open ended sleeve exposing a predetermined portion of said tubular needle.

4,022,192
APPARATUS FOR MEASURING THE FREQUENCY OF CARDIAC PULSES

Günther R. Laukien, c/o Bruker-Physik AG, am Silberstreifen, 7501 Karlsruhe-Forchheim, Germany

Continuation-in-part of Ser. No. 516,395, Oct. 21, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,297
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 F 17 Claims



1. An apparatus for examining the cardiacpulse frequency comprising:

a. an input for accepting a cardiac-pulse signal;

b. a pulse shaper and means connecting the pulse shaper to said input;

c. a pulse generator capable of producing a train of pulses with a recurrence frequency which is greater than the cardiac-pulse frequency;

d. a gate and means connecting said pulse generator to an input of the gate;

e. a first control unit for enabling said gate during a period of time between two cardiac-pulses, the pulses being separated by at most only a few intervening cardiac-pulses, means connecting said pulse shaper to the first control unit, and means connecting the first control unit to said gate;

f. a first counter and means connecting an output of said gate to the first counter;

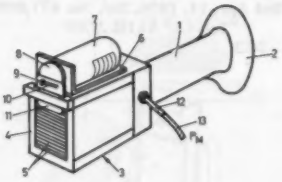
g. computing means for computing parameters relating to the cardiac-pulse frequency; the parameters comprising an instantaneous cardiac-pulse frequency and a frequency flutter value; and means connecting an output of the first counter to the computing means; and

h. display means for displaying parameters comprising the parameters listed in (g) and means connecting the computing means to the display means.

4,022,193
APPARATUS FOR DETERMINATION OF RESPIRATORY PASSAGEWAY RESISTANCE

Manfred Franetzki, Erlangen; Volker Korn, Nurnberg, and Karl Prestele, Erlangen, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 18, 1975, Ser. No. 559,655
Claims priority, application Germany, Mar. 22, 1974, 2413960
Int. Cl.² A61B 5/08
U.S. Cl. 128—2.08 14 Claims



1. In an apparatus for determining respiratory passageway resistance, including a flow tube having a passageway including a flow resistance with means for varying the resistance value periodically at a frequency lying above the breathing frequency, and pressure measuring means to measure the pressure in the flow tube, the improvement comprising: said flow resistance comprising a single fixed resistance extending across the passageway of said flow tube and having a flow surface determining a basic resistance value; and sinusoidally variable shutter means as resistance value varying means associated with said flow surface of said single fixed resistance for the periodic, substantially sinusoidal superposition of resistance variations onto said basic resistance value; said pressure measuring means comprising a mechanical-electrical pressure transducer connected by conduit to said flow tube passageway and having first and second measurement passageways connected to the output of said transducer, a frequency filter in each said measurement passageway, the frequency filter in said first passageway having a frequency for ascertaining pressure components due to low frequency breathing, and the frequency filter in said second passageway having a frequency for ascertaining pressure components due to higher frequency resistance variations caused by said shutter means.

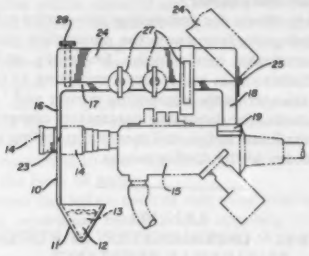
4,022,194
FIBEROPTIC SCOPE SHIELD AND INSTRUMENT HOLDER

Armin V. Banez, 510 Gypsy Lane, Youngstown, Ohio 44505

Filed June 2, 1975, Ser. No. 582,994
Int. Cl.² A61B 1/00
U.S. Cl. 128—4 6 Claims

1. A shield and instrument holder for use with a fiberoptic scope or the like having a body and an extending eye piece and comprising a substantially sized shield portion apertured inwardly of its edges for the reception of the eye piece and

arranged to engage said eye piece so as to hold said shield and instrument holder thereon in a position to shield a user's face, an extension on said shield portion and means on said extension for detachably engaging at least one instrument so as to position the same adjacent said scope in spaced relation to said eye piece.



4,022,195

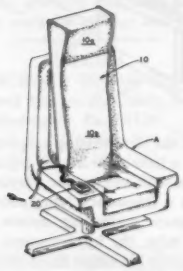
COMBINED MASSAGE AND SPOT HEATING DEVICE

Roy E. Meyer, Sterling, and Jerry E. Stuart, Morrison, both of Ill., assignors to Wahl Clipper Corporation, Sterling, Ill.

Filed Apr. 14, 1976, Ser. No. 677,008

Int. Cl.² A61H *21/00*

U.S. Cl. 128—24.2 **3 Claims**



1. A combined body massaging and spot heating device comprising a cushion containing a vibrator, a switchbox separate from said cushion and containing therein a resistor, electrical means for connecting said vibrator through said box with a source of electrical energy, switch means associated with said box which at one position connects said vibrator directly to said source to produce vibration of a relatively high amplitude, and which at another position connects said vibrator to said source through said resistor to produce vibration of lower amplitude, and a heating plate on said box positioned to receive heat from said resistor.

4,022,196

PENILE PROSTHETIC APPARATUS

Robert E. Clinton, 6403 S. 5th Ave., Phoenix, Ariz. 85041

Filed June 1, 1976, Ser. No. 691,391

Int. Cl.² A61F *5/00*

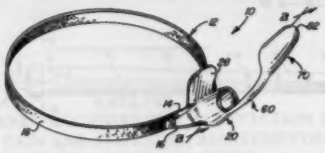
U.S. Cl. 128—79 **7 Claims**

1. Penile prosthetic apparatus comprising, in combination:

base means, including a support portion, a plate extending upwardly and forwardly from the support portion, a first bore extending longitudinally forwardly from the support portion and terminating in a guide portion, with the diameter of the bore decreasing from the support to the guide;

extension means, including a converter portion, a second bore extending longitudinally away from the first bore and having an opening disposed toward the first bore of the base means and having a closed tip remote from the opening of the second bore; and

connector means extending in a curve from the base to the extension and including a depression in the connector



extending from the bore of the base means to the bore of the extension means, the curve of the connector means providing an obtuse angle between the longitudinal axis of the first bore of the base means and the longitudinal axis of the second bore of the extension means.

4,022,197

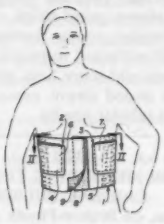
BODY SUPPORT AND PROTECTION APPLIANCE

Ignatius F. Castiglia, New York, N.Y., assignor to Thermo-Mold Medical Products, Inc., Burlington, N.J.

Filed May 4, 1976, Ser. No. 683,081

Int. Cl.² A61F *5/02, 13/02*

U.S. Cl. 128—101 **15 Claims**



1. A body support and/or protection appliance comprising:

a first elastic section adapted to extend across a body portion of a wearer;

a means for substantially independently engaging against predetermined spaced portions of the body of a wearer, comprising a pair of substantially rigid sheetlike members coupled to end portions of said first elastic section; and

second and third elastic sections respectively at the ends of said substantially rigid members remote from said first elastic section for detachably and elastically connecting said remote ends of said substantially rigid members together with at least a portion of at least one of said second and third elastic sections interposed therebetween to encircle a body portion of a wearer such that said elastic sections resiliently separate said substantially rigid members to permit substantial contraction and expansion of the encircled body portion of the wearer while retaining said substantially rigid members adjacent said predetermined body portions of the wearer during said contraction and expansion, without substantially restraining the body from expansion.

4,022,198

INTRAUTERINE DEVICE REMOVER

Neil Arthur Johnson, Sunnyvale, Calif., assignor to Alza Corporation, Palo Alto, Calif.

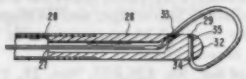
Filed Apr. 16, 1976, Ser. No. 677,762

Int. Cl.² A61F *5/46*

U.S. Cl. 128—130 **8 Claims**

1. Apparatus for removing an intrauterine device from a uterus via the cervical canal comprising:

a. a rod-shaped handle;
b. a hollow elongated tube, one end of which fits over one end of the handle such that the handle is slidable axailly within the tube from a first position to a second position;
c. a hole through the side of the hollow tube at the other end of the hollow tube; and
d. a filament extending from said other end of the tube through the hole to the said one end of the handle, one end of the filament being attached to the side of the

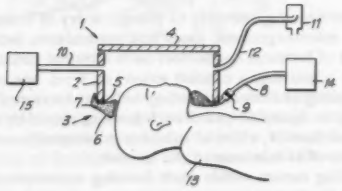


hollow tube at a position above and generally opposite the hole and the other end of the filament being attached to said one end of the handle, the filament being wrapped about said other end of the tube when the handle is in said first position and defining a loop of predetermined size that extends outwardly from said other end of the hollow tube when the handle is in its second position, the size of said loop being adjustable by sliding the handle between said first and second positions.

4,022,199
METHOD OF PREVENTING THE SPREAD AND CONTROL OF MASTITIS
Walter W. Fetty, 1218 Central Ave., Nebraska City, Nebr. 68410
Filed Sept. 24, 1975, Ser. No. 616,323
Int. Cl.² A61F *13/00*
U.S. Cl. 128—132 R **2 Claims**

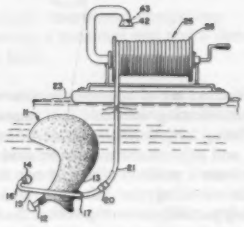
1. A method of preventing the spread of mastitis bacteria among milk producing animals, comprising the steps of:
a. providing a quantity of liquid mucilage gum comprising water, SD alcohol 40, polyvinyl alcohol, propylene glycol, PPG-28 Cetyl ether and methylparaben;
b. applying a substantially uniform coating of said liquid mucilage hum on the animals teats and milk canal; and
c. drying said mucilage gum to thereby form a pliable protective film thereon to prevent mastitis bacteria from intering the milk canal of healthy animals and from leaving the body of infected animals.

4,022,200
MEDICAL FACIAL MASK
Bjorn Jonson, Lund, Sweden, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany
Continuation of Ser. No. 474,683, May 30, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,392
Int. Cl.² A61M *16/00*
U.S. Cl. 128—141 R **6 Claims**



1. Medical facial mask for use with a patient lying in a supine position, said mask having an aperture; a source of gaseous medium; conduit means connecting said source to said aperture for transmitting the gaseous medium to a patient wearing said mask, said mask including a hollow transparent cylindrical portion having a uniform interior diameter defining said aperture and having a first end surface thereof of a size sufficient to extend over and encompass the face of the patient, a removable transparent lid portion being fastened to the opposite end surface of said cylindrical mask portion, sealing means tightly fastened to said first end surface of said mask along the circumference thereof and extending radially inwardly thereof towards the face of the patient, said sealing means including a hollow ring member formed of a generally soft elastic material, and a powder material filling the interior of said ring member; aspirating means; and suction conduit means extending laterally from said cylindrical portion and connecting said aspirating means to the interior of said ring member whereby, upon evacuating the air from the interior of said ring member, said sealing means is brought into a stiffened condition so as to hermetically seal the face of the patient within said facial mask; said conduit means also extending laterally from said cylindrical portion whereby, accessibility and visibility to said patient is attained.

4,022,201
REBREATHING CAP FOR SKIN DIVERS IN COMBINATION WITH FLOATING SNORKEL ATTACHMENT
Richard E. Diggs, S. 12A Road, Carthage, Mo. 64836
Filed Sept. 4, 1975, Ser. No. 610,425
Int. Cl.² A62B *7/12*
U.S. Cl. 128—145 A **4 Claims**



1. Breathing apparatus comprising a float, a reel mounted on said float, said reel having a tubular axle, a hose wound on said reel, one end of said hose connected to means whereby said hose is in internal communication with said tubular axle, a fixed tubular fitting means communicating with one end of said tubular axle, said hose affixed at one end to said fixed tubular fitting, the other end of said hose terminating with one end of a coupling, said other end of said coupling affixed to a first conduit, a flexible cap having an inner lining and an outer cover of relatively elastomeric material hermetically bound together at their peripheral edges thereby defining a space therebetween, said cap having secured thereto a second conduit means having means for unobstructed communication with said defined space, said second conduit terminating in a mouthpiece, said cap further comprising a depending skirt portion adapted and constructed to cover the nape of a diver, said skirt portion having retaining means for said conduit, said first conduit extending forwardly of said cap and terminating in a mouthpiece.

4,022,202
RESUSCITATOR INHALATOR OXYGEN VENTILATOR
William Edward Price, 5 Franklin Avenue, West Hill, Ontario, Canada
Filed Oct. 22, 1975, Ser. No. 624,991
Claims priority, application Canada, Jan. 17, 1975, 218069
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.8 **9 Claims**

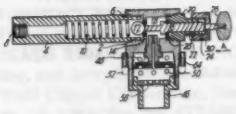
1. A resuscitator inhalator ventilator device for use with a supply of oxygen under pressure for administering to a patient comprising;
a body including a first passageway extending therethrough,

and means for connecting one end of said first passageway to a supply of oxygen under pressure, and a hollow projecting sleeve secured to the body and communicating with the other end of said first passageway and adapted for securement to a face mask,

and a manually operated primary valve in said first passageway controlling the flow of oxygen under pressure to the face mask, and means for selectively controlling the primary valve for continuous flow of oxygen or for manually operated intermittent flow,

and a metered orifice within said first passageway downstream of said primary valve metering a maximum pressure of oxygen which can pass therethrough to a patient, which maximum pressure being not greater than the highest safe pressure for a healthy lung,

and supplementary metering means by passing said metered orifice selectively adjustable to enable administration of oxygen at pressures less than said maximum pressure,



a first and second set of openings in side walls of the body and communicating with said first passageway, said second set being longitudinally spaced downstream of said first set, and adjustment means on said body selectively movable from a position covering one set of openings to a position covering the other set and to intermediate positioning partially covering both sets of openings, and a one-way valve positioned transversely in said passageway between the two sets of openings preventing flow in the downstream direction whereby, inward flow of ambient air into the device through said first set of openings is prevented when said second set is covered by the adjustment means while permitting discharge of air through said first set, and the positioning of the adjustment means over the said first set of openings enables inward flow and discharge of air through the second set of openings, a second passageway within said first passageway extending through said oneway valve and communicating said metered orifice and said first passageway downstream of said one-way valve.

4,022,203

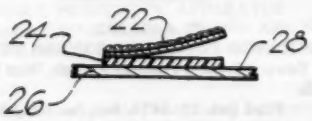
TREATED PATCH FOR MINOR CUTS

Win Ackley, 15240 Highland Place, Minnetonka, Minn. 55343

Filed Jan. 22, 1976, Ser. No. 651,605

Int. Cl.² A61L *15/00*

U.S. Cl. 128—156 **7 Claims**



1. An article for covering a cut area in the skin, comprising a substantially centrally disposed layer of liquid absorbable pad means containing at least a sufficient quantity of a blood coagulating substance consisting essentially of aluminum sulfate, said pad means disposed on a first backing layer having a dimension at least as large as said pad means and being liquid impermeable, said first backing layer being larger than said pad means and including a quantity of a pressure sensitive adhesive thereon, a second backing layer having a dimension larger than said first backing layer and containing a quantity of pressure sensitive adhesive on one surface thereon contacting the non-adhesive surface of said first layer.

4,022,204

DIMENSIONALLY STABLE SHAPED EYE BANDAGES

Albert R. LeBoeuf, Sturbridge, and William R. Grovesteen, West Dudley, both of Mass., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 526,022, Nov. 21, 1974, Pat. No. 3,978,164. This application Mar. 1, 1976, Ser. No. 662,765

Int. Cl.² A61F *13/12*

U.S. Cl. 128—163 **5 Claims**

1. A dimensionally stable shaped eye bandage for medicament delivery which can be cut and shaped in the dry form and thereafter hydrated in a buffered saline solution to form a bandage having from about 45% to 65% water after hydration, said bandage in dry form consisting essentially of polymerized random graft copolymers containing from about 67.2% to about 79.3% HEMA; from about 14.25% to about 35% PVP; from about 0.1% to about 4.04% EDMA; from about 0.1% to about 2.5% MA; from about 0.1% to about 5.0% water; from about 0 to about 4 ppm, based on the weight of HEMA monomer, of HQ inhibitor; and from about 50 to 250 ppm, based on the weight of HEMA monomer, of MEHQ inhibitor; said composition having been polymerized using only a low temperature polymerization initiator, with substantially all the oxygen having been removed from the polymerization mix prior to and during the polymerization reaction; the initial polymerization reaction being conducted at from 23° C to about 30° C., for from about 16 to about 30 hours, with the heat of the reaction continuously absorbed to control the reaction exotherm.

4,022,205

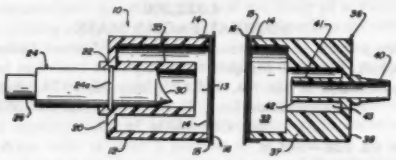
FLUID CONNECTORS

Francis J. Tenczar, P.O. Box 42919, Evergreen Park, Ill. 60642

Filed Nov. 5, 1973, Ser. No. 412,553

Int. Cl.² A61M *5/00;* **F16L** *47/00*

U.S. Cl. 128—214 R **20 Claims**



1. A connector assembly to prevent entry of contaminants, such as microorganisms, gases and particulates, including,

a pair of terminal connectors each terminal connector having a housing, a conduit extending from one end of the housing and communicating with the interior of the housing, an openable end of each housing closed by a penetratable barrier, a film of adhesive substantially covering the area of at least one of the barriers,

coupling means within each housing communicating with the conduit,

a penetrator element associated with one of the coupling means so that said barriers may be adhesively joined to immobilize any present environmental contaminants and to exclude contact with the environment at an area of adhesion and relative movement between the adhesively joined barriers and the penetrator element results in penetration of the barriers within the area of adhesion and communication between the terminal connectors so

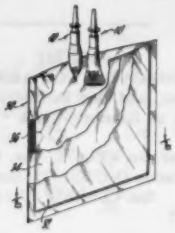
that fluid may move from a supply source to a delivery location through the conduits of the terminal connectors.

4,022,206

VACCINE DELIVERY SYSTEM

Maurice R. Hilleman, Lafayette Hill, and William J. McAleer, Ambler, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 1, 1975, Ser. No. 600,983
Int. Cl.² A61M *5/00*
U.S. Cl. 128—216 12 Claims



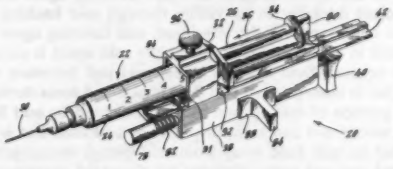
1. A vaccine delivery system suitable for human administration comprising a hypodermic syringe having a single dosage container portion made of a plastic material which is resiliently flexible at room temperature and a needle portion comprising a hollow sharp needle extending from the plastic container portion to convey fluids from within the container out through the tip of the needle when the needle is inserted under the skin and the container is squeezed, a vaccine in an amount suitable for human administration sealed within the container, the vaccine being in the lyophilized state, whereby the vaccine is preserved for storage and shipment and the syringe is protected from leakage during storage and shipment, and a separate container of a single dose of water for injection to reconstitute the lyophilized vaccine in the hypodermic syringe.

4,022,207

ACTUATOR FOR A SYRINGE

Paul S. Citrin, Danbury, Conn., assignor to Indicon Inc., Brookfield, Conn.

Filed Mar. 25, 1976, Ser. No. 670,358
Int. Cl.² A61M *5/00*
U.S. Cl. 128—218 C 13 Claims



1. A manually actuated mechanism for causing relative motion between a plunger and a cylinder of a syringe with precise incremental steps to enable the transport of precise quantities of liquid through the open end of the syringe comprising

a main body having a surface shaped to support the syringe with the plunger located alongside said surface for said relative movement in a liquid transport direction;

a plunger actuator slidingly mounted to the main body for movement along the liquid transport direction, said plunger actuator being shaped to engage a plunger of a syringe mounted on the main body surface and move the plunger along said liquid transport direction;

a finger actuatable pusher movingly mounted adjacent the plunger actuator on the main body for reciprocating motion along said liquid transport direction;

a ratchet mechanism operatively mounted to the plunger actuator and the pusher to provide incremental advance of the plunger actuator upon reciprocal movement of the pusher; and

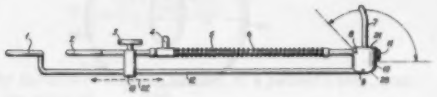
a back motion inhibitor operatively mounted between the plunger actuator and the main body, said inhibitor being oriented to enable movement of the plunger in said liquid transport direction while preventing reverse movement of the plunger actuator.

4,022,208

GYNECOLOGIC INSTRUMENT

Konstantin L. Valtchev, 15 La Rose Ave., Apt. No. 1614, Weston, Ontario, Canada (M9P 1A7)

Continuation-in-part of Ser. No. 491,826, July 25, 1974, abandoned. This application Nov. 7, 1975, Ser. No. 629,792
Int. Cl.² A61B *17/42*; A61M *31/00*
U.S. Cl. 128—239 11 Claims



1. A gynecologic instrument comprising:

a. a stem having a proximal end and a distal end,

b. a uterine hook,

c. a block,

d. said uterine hook being mounted in said block and said block being pivotally affixed to the distal end of said stem for angular adjustment of said block and said hook with respect to said stem,

e. said block having a flat surface from which said hook projects and a smooth part-spherical surface at a portion of said block remote from said flat surface,

f. and a control link having a proximal end and a distal end and being generally parallel to and spaced from said stem pivotally affixed at its distal end to said block and with its proximal end being adjacent the proximal end of said stem for controllably pivoting said block about its connection to said stem by reciprocal movement of said link relative to said stem,

g. said hook and said block adapted to be movable through an arc from a first position where said uterine hook and said stem are substantially parallel to a second position substantially more than 90° remote from said first position.

4. The instrument of claim 2, wherein said uterine hook comprises a tubular portion having an opening for passage of fluid therethrough.

4,022,209

RESILIENT SELF-CONTAINED FLUID EVACUATOR

John R. Nehring, Bergen, N.J., assignor to International Paper Company, New York, N.Y.

Continuation-in-part of Ser. No. 417,124, Nov. 19, 1973, Pat. No. 3,889,677. This application June 16, 1975, Ser. No. 587,142
Int. Cl.² A61M *1/00*
U.S. Cl. 128—278 18 Claims

1. A self-contained fluid evacuator comprising:

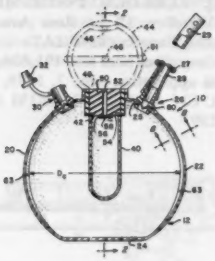
a. a container having at least one resilient wall capable of being deformed inwardly by applying an external pressure thereon, said resilient wall having sufficient resilience to return to an undeformed state upon release of said external pressure;

b. a resilient inflatable member within said container resiliently expandable between a natural state and a resiliently enlarged deformed state, the interior surface of said con-

tainer and the exterior surface of said inflatable member defining a fluid receiving chamber therebetween, said inflatable member having an opening therethrough connecting the interior of said inflatable member with the exterior of said container, said opening including means for restricting flow through said opening from said inflatable member;

c. an inlet in said container in flow communication with said chamber, said inlet being adapted to receive said fluid; and

d. an outlet in said container in flow communication with said chamber, said outlet including a one-way valve preventing flow into said chamber;



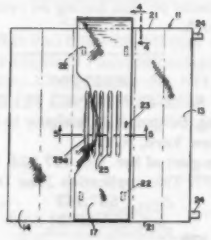
e. said one container wall being deformable inwardly to flow air outwardly of said chamber through said container outlet to reduce the volume of said chamber, said inflatable member being expandable from said natural state to its resiliently enlarged deformed state by flow of air through said opening into said member in response to return of said one container wall to its undeformed state and the reduced pressure generated thereby in said chamber whereupon return of the inflatable member to its natural state under force of its natural resilient bias flows air outwardly of said member through said restricted opening and produces a substantially constant negative pressure in said chamber for drawing fluid through said inlet into said chamber.

4,022,210

DISPOSABLE DIAPER WITH A SUPPLEMENTAL INSERT

Jacob A. Glassman, 1680 Meridian Ave., Miami Beach, Fla. 33139

Filed Aug. 11, 1975, Ser. No. 603,442
Int. Cl.² A61F *13/16*
U.S. Cl. 128—284 **11 Claims**



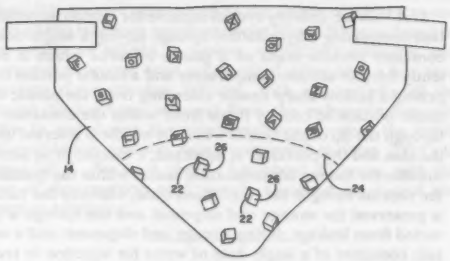
1. A double-duty diaper comprising, in combination, a main diaper having a fluid-pervious cover sheet, a fluid impervious backing sheet and having located therebetween a pad including at least one relatively thick, substantially rectangular layer of highly moisture-absorbent material having a longitudinal central portion, a detachable insert strip of less width than the main diaper comprising a fluid pervious cover sheet, a fluid impervious backing sheet and having located therebetween a highly moisture absorbent material said insert strip being superimposed on said longitudinal central portion and being lightly adhered to the inner surface of said one layer, means on said main diaper for securing same about the waist of a human body with said insert strip in position thereon to contact the body, and means comprising a portion of said insert strip for removing said insert strip from the main diaper without corresponding removal or impairment of the diapering potential of said main diaper comprising said insert strip having a length relative to said main diaper such that at least one end of the insert strip extends beyond a related end edge of the main diaper, said extended end being folded upon itself to provide a reinforced pull tab.

4,022,211

WETNESS INDICATOR FOR ABSORBENT PADS

Terry K. Timmons, and Dan D. Endres, both of Appleton, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 497,475, Aug. 14, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,659
Int. Cl.² A61F *13/16*
U.S. Cl. 128—287 **19 Claims**



1. An improved wetness indicating means in combination with an absorbent assembly in which said assembly is comprised of an absorbent pad and a light-transmitting fluid-impervious backing sheet in association with said pad, said indicating means comprising a water-dispersible coloring agent temporarily affixed to one surface of a carrier means disposed in association with, but separate from, said pad at the interface of said pad and said backing sheet, said pad being free of said coloring agent and said coloring agent being of sufficient intensity to be visible through said backing sheet when said agent is in dry condition, said coloring agent being present in an amount such that when said agent is contacted with aqueous fluid in areas where said pad becomes wetted out due to absorption of said fluid in said pad areas during use, that portion of said agent which is contacted by said fluid in said wetted out pad areas disperses in said fluid and is transported by said fluid away from said carrier means into said wetted out pad areas whereby the dispersed portion of said coloring agent is no longer visible through said backing sheet, the degree and area of the visual disappearance of said agent indicating the degree and area of wetness in said pad.

4,022,212

HYGIENIC GARMENT ASSEMBLY

Paula J. Lovison, 916 N. First St., Alhambra, Calif. 91801

Filed Aug. 7, 1975, Ser. No. 602,652
Int. Cl.² A61F *13/16*; A41B *13/02*
U.S. Cl. 128—288 **2 Claims**

1. A hygienic garment assembly comprising:

a panty-type garment including an elastic sheet member forming a trunk portion and front and rear panels depending downwardly from said trunk portion, an elastic

waistband secured to the upper edge of said trunk portion, and a pair of elastic legbands secured to corresponding lower side edges of said trunk portion and having front and rear ends secured to the associated side edges of said front and rear panels, said garment being devoid of a crotch portion and said front and rear panels being horizontally truncated and having horizontally extending fastening strips extending across their lower edges, said fastening strips being also secured to respective front and rear ends of said legbands;

a sanitary napkin having a generally elongated rectangular configuration but with the longitudinal side edges thereof being concavely inwardly curved, said napkin including a

moisture-resistant sheet member made of an inelastic material forming the bottom part thereof, an absorbent material carried above said sheet member, and horizontally extending fastening strips carried across the respective ends of said napkin; and

means detachably fastening the fastening strips of said napkin to the respective fastening strips of said front and rear panels, said naplin thereby providing the crotch portion of the garment assembly;

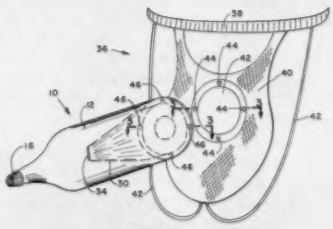
the longitudinal side edges of said napkin being inelastic but the legbands contiguous therewith being elastic, whereby the garment assembly will fit women of varying body sizes and shapes while still providing body-fitting support for said napkin.

4,022,213

DRIP URINAL

David Stein, 16740 NE. 9 Ave. No. 508, N. Miami Beach, Fla. 33162

Filed Aug. 21, 1975, Ser. No. 606,551
Int. Cl.² A61F 5/44
U.S. Cl. 128—295 1 Claim



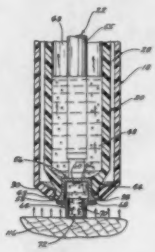
1. A urinal adapted to be worn over the male organ comprising: an elongated tubular sleeve having a mouth at one end for receiving the male organ and having an outlet means on the other end, a tubular resilient open-ended sheath secured to said sleeve along said mouth and extending into said sleeve, a resilient centrally apertured planar disc carried by the mouth of said sleeve, said disc extending radially inward from said mouth for sealing engagement about the male organ, a support garment having an aperture for receiving the male organ, and mutually engageable snap fastener means projecting from said support garment about said aperture and from said mouth for longitudinal engagement of said sleeve to said garment.

4,022,214

METHOD OF TREATING SUBSTANCES IN AN AMBIENT ENVIRONMENT WITH A CRYOGENIC MATERIAL

Robert R. Schulze, Des Moines, and Floyd R. Ladd, West Des Moines, both of Iowa, assignors to Robert R. Schulze, Des Moines, Iowa

Division of Ser. No. 570,723, April 23, 1975. This application Feb. 9, 1976, Ser. No. 656,349
Int. Cl.² A61B 17/36
U.S. Cl. 128—303.1 1 Claim



1. The method of treating an area of a patient's skin, comprising the steps of:

providing a cryogenic probe having an interior compartment normally closed by a movable valve means which has a hollow lower end portion positioned below the probe, the interior of said valve means being in communication with said interior compartment,

immersing the lower end of said probe in a cryogenic liquid,

opening said valve means to introduce the cryogenic liquid into said interior compartment and to the interior of said valve means,

closing said valve means,

removing the probe from the cryogenic liquid container,

and placing the lower end portion of said valve means into intimate contact with the area to be treated so that the heat of the patient's skin is conducted through the lower end portion of said valve means to cause the vaporization of the cryogenic liquid within the probe.

4,022,215

CRYOSURGICAL SYSTEM

Jerrel W. Benson, 2580 Snowberry Lane, Pepper Pike, Ohio 44124

Filed Dec. 10, 1973, Ser. No. 423,013
Int. Cl.² A61B 17/36
U.S. Cl. 128—303.1 32 Claims

1. A cryoprobe comprising:

a. a supporting structure

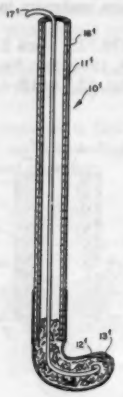
b. a deformable tip carried by said structure;

c. said tip including a porous mass which is deformable to conform substantially to the contour of a surface to be treated, and being capable following deformation to substantially retain its deformed configuration for use;

d. a cryogen-impervious membrane sheathing the mass;

e. the mass defining interconnected spaces for transmitting cryogen to the inner surface of the membrane; and,

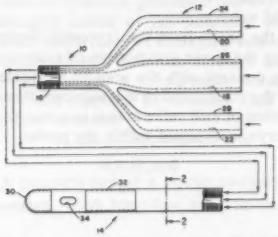
f. said membrane being operative to retain cryogen within said tip.



4,022,216
UROLOGICAL CATHETER

Robert C. Stevens, 2451 Brickell Ave., Miami, Fla. 33129

Filed Aug. 11, 1975, Ser. No. 603,699
Int. Cl.² A61M 25/00
U.S. Cl. 128—349 B 1 Claim



1. In a urological catheter comprising an elongated tubular member having a proximal end portion, a distal end portion for insertion into the bladder of a patient, a fluid passage extending from said proximal end portion to a draining eye in said distal end portion inflatable balloon means on said distal end portion and passage means leading from said proximal end portion to the interior of said balloon means,

the improvement wherein said distal end portion has

a closed tip,

a first inflatable balloon enveloping said tip to prevent contact of bladder tissue by said tip, and attached to said member in a single zone of attachment that extends around the entire circumference of said member, and

a second inflatable balloon attached to said member at a location spaced apart from said first balloon;

said drainage eye disposed intermediate said first and second balloons, thereby enabling said balloons to restrain collapsed bladder tissue from occluding said said drainage eye;

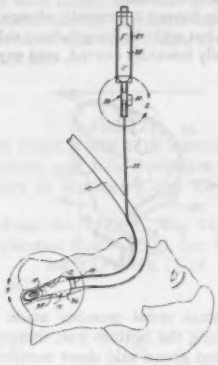
the distance along said distal end portion from said tip to the portion of said second balloon most remote from said tip is between about 1 and 2 inches;

the distance between said drainage eye and each of said balloons is about 0.1 inch.

4,022,217
CUFF CONFIGURATION FOR CUFF TRACHEAL TUBES

Donald R. Rowean, Poway, Calif., assignor to Dupaco Incorporated, San Marcos, Calif.

Filed Sept. 15, 1975, Ser. No. 613,459
Int. Cl.² A61M 25/00
U.S. Cl. 128—349 B 20 Claims

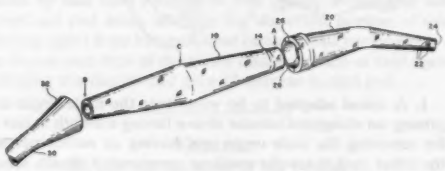


1. A tracheal tube in combination comprising an elongated tube for extending into the trachea of a patient to deliver air into the lungs of the patient; a flexible cuff fixed to and surrounding the tube adjacent a posterior end of the tube and having anterior and posterior ends sealed to the tube to form a continuous hollow interior between the ends of the cuff for receiving a supply of fluid; and means for filling the hollow interior of the cuff with fluid to inflate the cuff outwardly to seal the cuff against the patient's trachea, the cuff having an inflated configuration defining a bulbed anterior portion for sealing to the trachea and being continuous with and in fluid communication with a narrowed posterior portion extending distally away from the bulbed anterior portion, the length of the cuff between the posterior and anterior ends thereof being substantially greater than the extent of the cuff length occupied by the bulbed anterior portion of the cuff, the bulbed portion having in an unconfined inflated state of the cuff a diameter substantially greater than that of the portion of the cuff posteriorally of the bulbed portion.

4,022,218
SURGICAL SUCTION TUBE

Max F. Riddick, 1520 Neola Trail, Winter Park, Fla. 32789

Filed Sept. 22, 1975, Ser. No. 615,425
Int. Cl.² A61M 27/00
U.S. Cl. 128—350 R 9 Claims



1. A surgical suction tube highly resistant to clogging for removing debris such as bone particles, blood, irrigating solution, and the like from an operative wound when connected to tubing supplying suction to the tube, comprising:

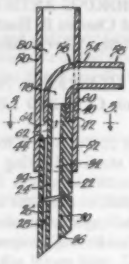
suction tip means for inserting into a wound, said tip means having at least one opening therein through which the debris is drawn; and

turbulence-generating means having an inlet and an outlet, said inlet normally connected to said suction tip means, and said outlet normally connected to said tubing, said turbulence-generating means utilized for agitating the debris to prevent cohesion or packing of the debris whereby the debris is caused to flow freely into the tubing, said turbulence-generating means being essentially symmetrical with respect to said inlet and said outlet.

4,022,219
ENDOTRACHEAL DEVICE

Edward Basta, 300 N. State St., Suite 4930, Chicago, Ill. 60610

Filed July 28, 1975, Ser. No. 599,534
Int. Cl.² A61M *25/00*
U.S. Cl. 128—351 **8 Claims**



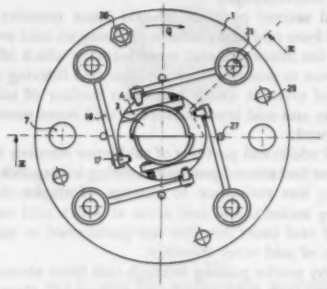
1. An endotracheal tube comprising a tubular member having a proximal end, a tapered distal end and two lumen connecting said ends for transport of oxygen to and aspirating fluid from the body of a patient, the first of said lumen being formed by an elongate cannula secured along a longitudinal side thereof to the inside wall of said tubular member and terminating at the short end of the tapered distal end of said tube, said cannula having an outside diameter less than the inside diameter of said tubular member whereby the second of said lumen is defined by the space between said cannula and said tubular member and terminates at the long end of said tapered end of said tube, the cross-sectional area of said second of said lumen is smaller than the cross-sectional area of said first of said lumen, an adaptor having a member connected to said lumen in said cannula for connecting said lumen in said cannula to a source of suction, said adaptor having a sleeve connected with said tubular member with the lumen in said sleeve communicating with the lumen in the tubular member for connecting said second lumen to a source of oxygen under pressure whereby the patient may be administered oxygen through the second lumen at an axially spaced location from the inlet of fluids being aspirated from the body through the first lumen.

4,022,220
CUTTER HEAD FOR A MACHINE FOR PICKING SPROUTS

Antonius Johannes Cornelus Alkemade, Herenweg 1, Noordwijk, Netherlands

Filed Nov. 18, 1975, Ser. No. 633,093
Claims priority, application Netherlands, Jan. 28, 1975, 7500956
Int. Cl.² A01D *55/22*
U.S. Cl. 130—30 R **12 Claims**

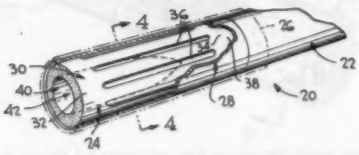
1. A cutter head for a machine for picking sprouts from a stalk comprising a base having an opening into which said stalk is intended to be inserted in a generally axially downstream direction, means for rotating said base about said axis, a plurality of cutting elements mounted on said base and spaced apart from each other around said opening, sensing means carried by and rotatable with said base located downstream from said cutting elements for sensing the presence of a stalk in the opening, said sensing means being movable in response to the presence of a stalk, and actuating means connected to said sensing means for moving said cutting elements toward said axis to cut sprouts from a stalk detected by said sensing means and for moving said knives away from said axis when said stalk is removed from said sensing means.



4,022,221
TOBACCO SMOKE FILTER

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Filed Oct. 31, 1975, Ser. No. 627,858
Int. Cl.² A24D *1/04*
U.S. Cl. 131—10.5 **15 Claims**



1. A smoke filter means including a filter element comprising:

a. an axially elongated, hollow, outer member;

b. an axially elongated inner member disposed within said outer member;

c. said outer member including an inner surface and having spaced end portions;

d. said inner member comprising a filtering material and including an outer surface and having spaced end portions;

e. integral circumferentially continuous peripheral portions of said outer surface of said inner member being juxtaposed to portions of said inner surface of said outer member at at least one end portion of said inner and outer members to at least substantially preclude axial passage of smoke across the area therebetween;

f. limited portions of the remaining outer surface of said inner member, excluding said peripheral portions, being spaced from said inner surface of said outer member to define outer cavity means therebetween which offer less resistance to passage of smoke than said filtering material and said areas at which said outer surface of said inner member and said inner surface of said outer member are juxtaposed;

g. a major portion of the total outer surface of said inner member, including said peripheral portions, being juxtaposed to said inner surface of said outer member to provide substantially uniform support to said outer member by said inner member throughout its length;

h. integral first portions of said inner member extending transversely substantially completely across said inner

member in the form of an uncrimped plug of filtering material offering substantially the same resistance to passage of smoke as other portions of the filtering material of said inner member and defining a tortuous path for smoke therethrough;

i. integral second portions of said inner member axially spaced from said first portions, defining an area extending across the interior of said inner member which offers less resistance to passage of smoke than said filtering material and said areas at which said outer surface of said inner member and said inner surface of said outer member are juxtaposed;

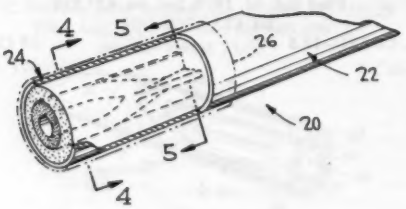
j. integral additional portions of said inner member between said first and second portions defining inner cavity means offering less resistance to passage of smoke than said filtering material and said areas at which said outer surface of said inner member are juxtaposed to said inner surface of said outer member;

k. whereby smoke passing through said filter element must travel through both said cavity means and through said filtering material.

4,022,222
TOBACCO SMOKE FILTER

Richard M. Berger, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.

Filed Nov. 6, 1975, Ser. No. 629,663
Int. Cl.² A24F *7/04*
U.S. Cl. 131—10.5 **9 Claims**



1. A smoke filter means including a filter element comprising:

a. an axially elongated, hollow, outer member;

b. an axially elongated, hollow, inner member disposed within said outer member and extending at least substantially over the full length of said filter element;

c. an axially elongated, hollow, intermediate member disposed between said inner and outer member at least substantially throughout their lengths;

d. said outer member including an inner surface and having spaced end portions;

e. said inner member comprising a first filtering material and including an inner surface and an outer surface and having spaced end portions;

f. said intermediate member comprising a second filtering material and including an inner surface and an outer surface and having spaced end portions;

g. said outer surface of said intermediate member being juxtaposed to said inner surface of said outer member to at least substantially preclude axial passage or smoke across the area therebetween, and said inner surface of said intermediate member being juxtaposed to said outer surface of said inner member to at least substantially preclude axial passage of smoke across the area therebetween while permitting transverse passage of smoke between said intermediate and inner members; whereby said intermediate member substantially completely fills the spaced between said inner member and said outer member;

h. a integral first portions of said inner member defining a first area extending across the interior of said inner member which offers at least as much resistance to passage of smoke as said first filtering material;

i. second portions of said inner member defining a second area extending across the interior of said inner member which offers less resistance to passage of smoke than said intermediate member, said second portions being axially spaced from said first portions;

j. the interior of said inner member between said first and second portions defining elongated cavity means; and

k. said intermediate member offering less resistance to passage of smoke than said inner member;

whereby smoke passing through said filter element must travel through said cavity means and said first and second filtering materials.

4,022,223
SMOKING ARTICLE

Norman B. Rainer, and Charles B. Hoelzel, both of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed July 26, 1973, Ser. No. 382,952
Int. Cl.² A24D *1/06*
U.S. Cl. 131—10.9 **8 Claims**

1. A smoking article comprising a tobacco or tobacco-substitute portion and a smoke filtering portion therefor, said smoke filtering portion containing a filtering element and a metal salt-amine complex wherein the amine of the complex is a non-volatile amine having a molecular weight of from about 450 to about 60,000 and having a vapor pressure below about 0.01 mm. Hg. at 20° C., said metal salt being soluble in water or aqueous ammonia and said metal salt-amine complex exhibiting a mole ratio of metal cation to co-ordinated amine radical of about 1:1 to about 1:4, said complex being incorporated in said smoke filtering portion in an amount from about 0.1% to 40% by weight thereof, the cation of said metal being selected from the group consisting of copper, nickel, iron, cobalt, manganese and mixtures thereof.

4,022,224
REDUCTION OF SUPEROXIDE ACCUMULATION CAUSED BY SMOKE INHALATION

Mark G. Saifer, Berkeley; Lewis D. Williams, Menlo Park, and Wolfgang Huber, Atherton, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.

Filed Sept. 9, 1975, Ser. No. 611,662
Int. Cl.² A24B *15/02*; **A61M** *15/06*
U.S. Cl. 131—262 R **8 Claims**

1. A method for reducing the toxic effects of smoke inhalation by a mammal which comprises administering thereto by inhalation, proximate the inhalation of the smoke, of an amount of orgotein effective to reduce the concentration of superoxide radicals generated by the smoke in the respiratory tract of the mammal.

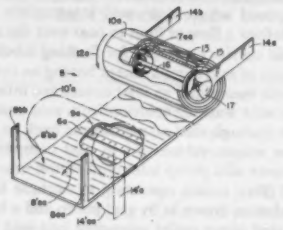
4,022,225
COIL CURLER

Robert T. Kauffman, 6495 Broadway, New York, N.Y. 10471

Filed June 4, 1976, Ser. No. 692,796
Int. Cl.² A45D *2/00*
U.S. Cl. 132—31 R **2 Claims**

1. A hair curler article comprising in combination: an elongated tape element substantially rigid transversely along a width thereof and substantially flexible along a longitudinal axis of its elongated length thereof; and spring means for causing the elongated tape element to become coiled along its longitudinal axis, the spring means comprising a spool element and a central coil spring and handle means for gripping with one's fingers and for anchoring one end of the central spring, said central spring being connected at one end thereof to the spool element and at an opposite end thereof to the handle means, with the tape's end attached to the spool element, adapted to cause strands of hair laid upon the tape element

before retraction of the central spring, to become drawn and curled between consecutive coils of the elongated tape in a retracted coiled state, and the handle means including a fastening element bendable to and fro alternately preventable of



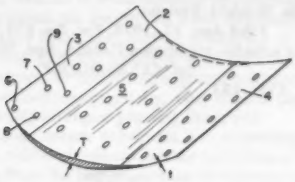
coiled tape element and entrapped curled hair from uncoiling and when desired releasable of the same, a proximal end of the elongated tape element being fixedly mounted onto said spool element.

4,022,226

TENSION CURLER

Walter J. Muenstermann, Denver, Colo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jan. 9, 1976, Ser. No. 647,711
Int. Cl.² A45D 2/02
U.S. Cl. 132—39 **2 Claims**



1. A tension curler for curling wet hair, said curler comprising

a spring-like sheet of resilient material rolled to have free overlapping end edges and forming a substantially cylindrical member, said end edges being freely slidable relative to each other to vary the diameter of the cylindrical member during use of the tension curler, said sheet having a central area intermediate its end edges of greater thickness than the remainder thereof, said sheet comprising plastic and the hair of a user being wound around the outside of the cylindrical member for wet-setting and drying thereof, said cylindrical member contracting in application to wet hair and thereafter expanding for a tight curl and durable set.

4,022,227

METHOD OF CONCEALING PARTIAL BALDNESS

Frank J. Smith, 233 Cosmos Drive, and Donald J. Smith, 517 Brockway Ave., both of Orlando, Fla. 32807

Filed Dec. 23, 1975, Ser. No. 643,681
Int. Cl.² A41G 3/00
U.S. Cl. 132—53 **5 Claims**

1. A method for styling hair to cover bald areas using only the individual's own hair, comprising separating the hair on the head into several substantially equal sections, taking the hair on one section and placing it over the bald area, then taking the hair on another section and placing it over the first section, and finally taking the hair on the remaining sections

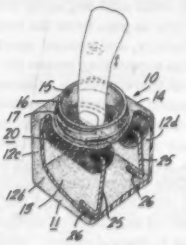
and placing it over the other sections whereby the bald area will be completely covered.

4,022,228

NAIL POLISH REMOVER DEVICE

John G. Ropp, 140 Runnymede Road, West Caldwell, N.J. 07006, and Steven A. Mann, 749 N. Broad St., Elizabeth, N.J. 07082

Filed Mar. 12, 1975, Ser. No. 557,454
Int. Cl.² A45D 29/17; A46B 11/00
U.S. Cl. 132—75 **6 Claims**

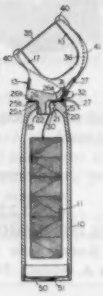


1. A device for removing nail polish and other nail coatings from a person's fingernails comprising: a plastic container comprised of top, bottom and side walls and having an access opening in said top wall and containing therein during use of the device a suitable nail polish solvent; rubbing means disposed at a given location within said container immediately beneath and laterally across said access opening and having an elongated, curved configuration with the interior portion of the curvature defining a rubbing area for receiving and making rubbing contact with the person's fingernail when the corresponding fingertip is inserted through said access opening and being operative in response to slight movements of the fingertip to effect removal of the nail polish from the fingernail by a rubbing action of the solvent on the fingernail; mounting means comprising a resilient support member connected to and supporting thereon said rubbing means and being resiliently wedged in said container between said top and bottom walls thereby mounting said rubbing means at said given location, said resilient support member having an elongated shape having a body portion connected to said rubbing means and extending along the top wall of said container, two leg portions connected to opposite ends of said body portion and extending downwardly along a side wall portion of said container to the bottom wall of said container, and two foot portions connected to respective ones of said leg portions and being bent inwardly away from said side wall portions such that said resilient support member is resiliently wedged between the top and bottom walls of said container said resilient support member having means for preventing the end tips of said two foot portions from puncturing the bottom wall of the plastic container; and means rendering said container opaque to visible light so that the dissolved nail polish which accumulates in the solvent is not visible through said container walls.

4,022,229
DENTAL FLOSS HOLDER

Karlis Minka, 204 E. Joppa Road, Towson, Md. 21204

Filed Aug. 5, 1976, Ser. No. 711,722
Int. Cl.² A61C 15/00
U.S. Cl. 132—92 R 11 Claims

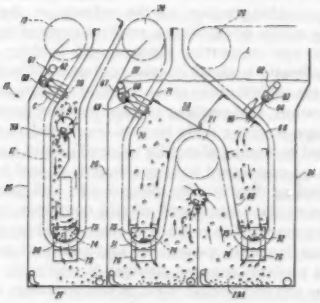


1. A dental floss holder having a longitudinal axis and comprising a hollow handle adapted to receive a supply of floss, said handle having an engaging end, a cap having a shank in releasable assembly with said engaging end, a passageway to permit a length of floss to pass from the inside of the handle to the outside of the holder, and spaced apart studs on said cap, the studs having floss supporting means for retaining a portion of said length of floss therebetween, wherein the improvement comprises a continuous end surface on said engaging end and a continuous bottom surface on said cap, said end surface and said bottom surface extending transversely outwardly with respect to said axis, the inward portion of said end surface and of said bottom surface cooperating to clamp the beginning of said length of floss therebetween, and the outward portion of said end surface and of said bottom surface forming an annular outwardly facing V-shaped groove therebetween, the width of said V-shaped groove being of dimensions sufficient for inward wedging of the end said length of floss into the V-shaped groove, said shank and said engaging end constituting a male and a female element, respectively.

4,022,230
CONTAINER WASHING APPARATUS

Momir Babunovic, Des Peres, Mo., assignor to Barry-Wehmiller Company, St. Louis, Mo.

Filed Aug. 18, 1975, Ser. No. 605,279
Int. Cl.² B08B 3/02, 9/08
U.S. Cl. 134—73 9 Claims

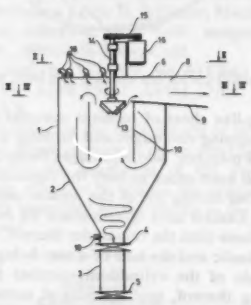


1. Container washing apparatus comprising a washing solution containing compartment, container carrier conveyor means operable to carry containers in a loop path which is directed downwardly and then upwardly through said compartment, imperforate guide means in said compartment in position to be engaged by the containers in the downward and upward travel, said guide means being interrupted at a zone above the bottom of the loop path where said carrier conveyor and the containers will transverse the interruption, nozzle means disposed adjacent to said interruption in said guide means to deliver a flow of fluid to pass over the containers and through said carrier conveyor for flushing labels therefrom, a pump outside of said compartment having an outlet connected to said nozzle means and an inlet connected into said compartment to receive washing solution from said compartment and circulate it through said nozzle means back to said compartment, filter means submerged in said compartment and located to cover said pump inlet connection into said compartment, said filter means operating to exclude labels from the washing solution drawn in by said pump and a branch connection from said pump outlet extending into said filter means to return filtered washing solution to said filter means to flush labels therefrom.

4,022,231
CHIP WASHER

Aatos Kostiainen; Ilmari Paakkinen, and Paavo Rantasuo, all of Savonlinna, Finland, assignors to Enso-Gutzeit Osakeyhtio, Helsinki, Finland

Filed Apr. 12, 1976, Ser. No. 675,956
Claims priority, application Finland, Apr. 30, 1975, 751292
Int. Cl.² B08B 3/04
U.S. Cl. 134—133 8 Claims



1. A chip washer of the type having an upright container with an upper cylinder and a lower funnel fitted with valve means for removing foreign materials from the container, comprising:

a substantially vertical outlet pipe inside the cylinder and forming an annular space therewith,

means for feeding chips to the upper part of the annular space,

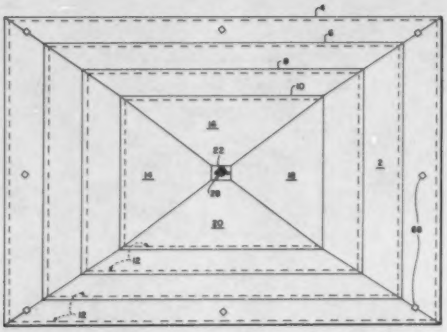
means for tangentially introducing washing liquid from close to the edge of the cylinder for bringing the chips and the washing liquid in the annular space into a circulatory motion forcing the chips downwards to separate the foreign materials from the chips and pass the washed chips into the outlet pipe,

and an outlet channel connected to the outlet pipe for removing the washed chips from the container.

4,022,232
INVERTED CARGO HATCH TENT

David G. Ross, Los Alamitos, and Jack Wybenga, West Covina, both of Calif., assignors to Retla Steamship Company, Long Beach, Calif.

Filed Jan. 26, 1976, Ser. No. 652,254
Int. Cl.² B63B 19/14
U.S. Cl. 135—6 13 Claims



1. An inverted hatch tent operable for protecting a ship's cargo from water damage comprising, in combination:

a. a substantially rectangular flexible liner having a length dimension, a width dimension and an upper and a lower surface; and

b. a gripping means extending from said lower liner surface, said gripper means being further defined by a plurality of concentrically arranged substantially rectangular gripping lines; wherein one substantially rectangular gripping line is proximate the length and width dimensions of said liner whereby said upper surface is adapted to assume a concave configuration whenever said liner is supported upon a rectangular hatch coaming that is complementary to, and operably engaged by, one of said plurality of concentrically arranged gripping lines; and

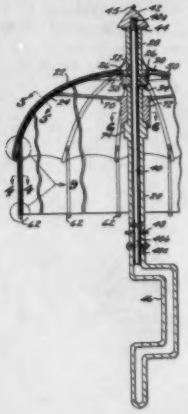
c. a water drain means proximate and extending through said liner, said drain means further including a drain line extending from the bottom surface of said liner and communicating with the upper surface of said liner in the vicinity of an apex of said concave configuration; whereby water accumulating on the upper surface of said liner will be drained.

4,022,233
VENETIAN UMBRELLA

Erwin W. Grundman, 15120 Woodruff Ave. Apt. No. 7, Bellflower, Calif. 90706

Filed Aug. 25, 1975, Ser. No. 607,428
Int. Cl.² A45B 11/02, 15/00
U.S. Cl. 135—20 M 10 Claims

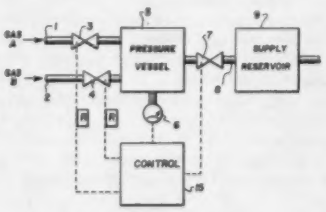
1. An umbrella of the type which includes a center pole comprising a first outer tube and a second inner tube adapted to rotate within said first tube, from which radiate a plurality of collapsible ribs supporting a top cover material and radiating from said first outer tube including an encircling drape of material attached near the outer circumferential edges of said cover material; said drape being extendible down to a predetermined length; and control means connected through each rib provided to foldably raise and lower said drape.



4,022,234
METHOD AND APPARATUS FOR MIXING TWO GASES IN A PREDETERMINED PROPORTION

Gunter Dobritz, Lubeck, Germany, assignor to Dragerwerk Aktiengesellschaft, Germany

Filed Nov. 14, 1975, Ser. No. 631,889
Claims priority, application Germany, Nov. 26, 1974, 2455751
Int. Cl.² G05D 11/00
U.S. Cl. 137—7 3 Claims

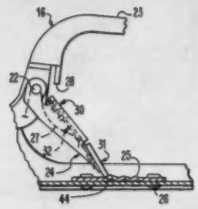


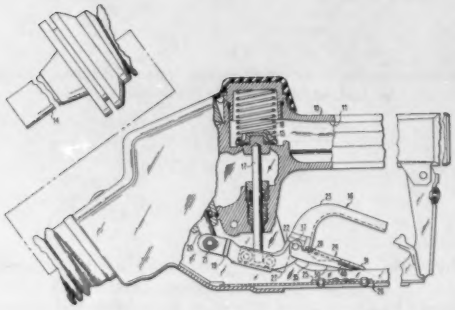
1. A method of controlling the proportion of two gases which are delivered to a mixed gas line from a pressure control vessel, comprising continuously monitoring the pressure in the control vessel and when the pressure therein is at an initial predetermined pressure admitting a first gas into the pressure control vessel until the pressure in the vessel increases to a predetermined higher pressure and then stopping the admission of the first gas and initiating the admission of a second gas into the pressure control vessel, continuing to admit the second gas until a predetermined additional higher pressure is reached at which the admission of the second gas is stopped and the mixed gas is withdrawn through the mixed gas line continuing to withdraw the mixed gas through the mixed gas line until the pressure in the pressure control vessel reduces to the initial pressure and stopping the withdrawal at the reaching of the initial pressure and initiating once again the admitting of the first gas into the pressure control vessel and repeating the process.

4,022,235
LIQUID DISPENSING NOZZLE HAVING A FLEXIBLE RETAINING ARRANGEMENT

Robert L. Murray, Dayton, Ky.; Donald L. Leininger, and Charles L. Polson, both of Cincinnati, Ohio, assignors to Dover Corporation, New York, N.Y.

Filed Feb. 13, 1976, Ser. No. 658,022
Int. Cl.² B67D 5/371
U.S. Cl. 137—38 16 Claims





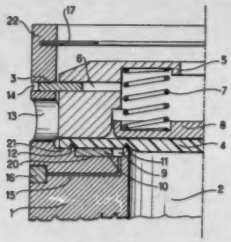
1. A liquid dispensing nozzle comprising a body, valve means in said body to control flow therethrough, means to actuate said valve means to move said valve means to its open position, trigger means pivotally connected to one of said actuating means and said body, retaining means supported by the other of said actuating means and said body and cooperating with the end of said trigger means remote from its pivotal connection to enable said trigger means to hold said actuating means in a position in which said valve means is open, means acting on said trigger means to continuously urge the remote end of said trigger means out of engagement with said retaining means, and at least one of said trigger means and said retaining means including flexible means to cause flexure of at least the one of said retaining means and said trigger means when the remote end of said trigger means engages said retaining means.

4,022,236
SAFETY DEVICE FOR A COMPRESSED GAS TANK

Pierre Dumont, and Jacques Vigreux, both of Lyon, France, assignors to Delle-Alsthom, Villeurbanne, France

Filed Apr. 3, 1975, Ser. No. 564,973
Claims priority, application France, Apr. 26, 1974, 74.14707
Int. Cl.² F16K 13/04
U.S. Cl. 137—70 7 Claims

1. In combination, a safety device, a compressed gas tank including a cylindrical member defining a tank discharge passage for said tank and open to said tank interior, said cylindrical member including within said passage two spaced concentric seats, said safety device comprising a flexible membrane spanning across said passage, subjected on the one side to the gas pressure of the tank and on the other side to a biasing elastic effort, the improvement wherein: said membrane is urged by said elastic effort, on said one side, against said two spaced, concentric seats in opposition to said gas pressure such that a normal tank gas pressure on the membrane corresponds to a sealing position of the seat having the smallest diameter, and a tank gas overpressure is transmitted to the seat having the largest diameter by elastic deformation of the membrane to cause the sudden opening of the device, said membrane being pressed against the seat having the smallest diameter by a mobile circular central plate having a diameter slightly in excess of the seat having said smallest

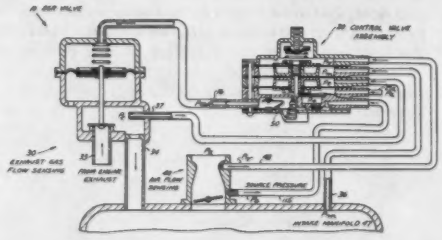


diameter and said membrane being pressed against the seat having the largest diameter by a ring concentric with the mobile plate, said biasing elastic effort comprising at least one spring mounted between the mobile plate and said ring, and at least one breaking part fixedly mounting said ring relative to said cylindrical member such that said breaking part breaks suddenly under the effect of a predetermined gas overpressure.

4,022,237
EXHAUST GAS RECIRCULATION FLOW CONTROL SYSTEM

Harry P. Wertheimer, Horseheads, N.Y., assignor to The Bendix Corporation, South Bend, Ind.

Division of Ser. No. 446,856, Feb. 28, 1974, Pat. No. 3,926,161. This application July 29, 1975, Ser. No. 600,172
Int. Cl.² F15B 5/00
U.S. Cl. 137—85 10 Claims

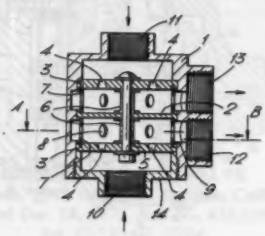


1. In a control valve, a housing having an inlet, and an outlet, said housing defining a chamber therewithin, pressure responsive means dividing said chamber into a first section communicated to a first independent control pressure parameter, a second section communicated to a predetermined pressure level, valve means shiftable from a first condition communicating said second section with said outlet to a second condition, said valve means in said second condition terminating communication between said second section and said outlet but permitting communication between said inlet and said outlet, first means responsive to the pressure differential between said first and second sections to actuate said valve means, and second means responsive to a second independent control pressure for opposing the force generated by said pressure differential created between the first and second sections, said second independent control pressure being affected by the pressure level at said outlet to provide a feedback control on the operation of said valve elements.

4,022,238
PRESSURE COMPENSATING DEVICE FOR MIXING FAUCETS

Lars Nordentoft, Menden, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,484
Claims priority, application Germany, Dec. 14, 1974, 2459317
Int. Cl.² G05D *11/00*; F16K *31/365*
U.S. Cl. 137—98 5 Claims



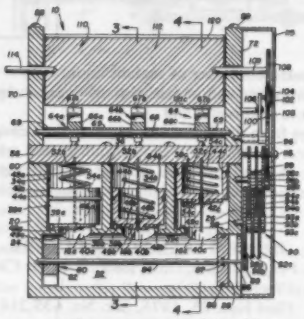
1. A pressure compensation device for fluid mixing valves comprising:
- a hollow housing including first and second inlet openings thereon respectively communicating with first and second outlet openings thereon;
- a flexible diaphragm mounted within said housing and separating said first inlet and said first outlet from said second inlet and said second outlet, thereby to form first and second chambers in said housing separated by said diaphragm;
- each chamber including a flexible throttle plate mounted therein, said throttle plate being fixedly mounted at its peripheral edge portion to said chamber thereby sealingly separating the inlet opening from the outlet opening, and said throttle plate having a plurality of tapered apertures therein which open toward said outlet opening for conducting fluid therethrough and wherein the cross-sectional area of said apertures decreases when said throttle plate flexes toward said outlet opening in response to fluid pressure at said inlet opening; and
- means cooperating with said diaphragm for interconnecting said throttle plates wherein translation of one of said throttle plates provides an opposite translation of the other of said throttle plates, whereby said other of said throttle plates flexes away from its corresponding outlet opening when said one of said throttle plates flexes toward its corresponding outlet opening.

4,022,239
HYDRAULIC-METERING MULTIPLE VALVE

Bernell W. Schwindt, and Jackson T. Schwindt, both of 17621 Irvine Blvd. Suite 101, Tustin, Calif. 92680

Filed July 17, 1975, Ser. No. 596,898
Int. Cl.² A01G *25/00*; F16K *11/20*
U.S. Cl. 137—119 10 Claims

1. A hydraulic-metering, multiple-valve device comprising:
- a valve housing having an inlet port and a plurality of outlet ports, and a fluid-flow channel common to all outlet ports disposed therebetween having communicating ports arranged therein to allow fluid flow between said inlet and outlet ports;
- a plurality of piston bores intersecting said flow channel and said outlet ports;
- a cover plate having a plurality of passageways communicating between each piston bore and the atmosphere, whereby fluid in said bore is allowed to discharge when said piston valve is moved to an open position;
- a plurality of valve means positioned between said flow channel and said outlet ports, whereby fluid flow from said flow to said outlet ports is controlled, and wherein each of said valve means comprises:
- a valve piston slidably disposed within each of said piston bores to provide a closed or open valve position therein:
- a gasket removably secured to said valve piston;
- a valve seat positioned adjacent said channel adapted to accommodate said gasket when said valve piston is in a closed position; feature.
- biasing means connected to said piston valve whereby said valves are held in a normally-closed position;
- a drum rotatably mounted to said valve housing;
- a plurality of valve-actuating means connected between said drum and corresponding valve means for selectively opening and closing each of said valve means as said drum rotates;
- wherein each of said valve-actuating means comprises:
- a rocker arm rotatably supported to said valve housing, said arm having a vertical tongue integrally formed thereon;
- a gasket secured to the undersurface of said rocker arm for



direct sequential engagement with said cover-plate passageway, thereby controlling the position of said piston valve within said valve housing; and
- a spring positioned between said rocker arm and said cover plate, whereby said rocker arm is biased to close said cover-plate passageway to the atmosphere;
- a drive means for rotating said drum, said drive means being positioned down stream of said inlet port of said valve housing and disposed in said fluid flow channel and being operably connected to said drum, wherein said drive means comprises:
- an impeller rotatably mounted within said flow channel, the impeller being positioned adjacent said inlet port, whereby fluid flow therethrough rotates said impeller;
- a drive shaft having said impeller affixed at one end thereof and rotatably mounted within said valve housing; and
- a drive gear affixed to the opposite end of said drive shaft for direct engagement with said gear train means; and
- a gear-train means operably connected between said drum and said drive means.

4,022,240
SLIDE VALVE SEALANT SYSTEM

Hamilton W. Marshall, Jr., Ridgefield; Lucian C. Ducret, Riverside, and John G. Atwood, Redding, all of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Aug. 22, 1974, Ser. No. 499,854
Int. Cl.² F16K *3/36*
U.S. Cl. 137—209 3 Claims

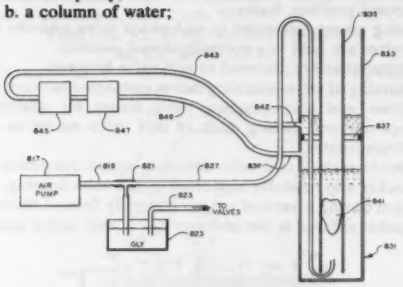
1. An improved sealing arrangement for a slide valve comprising a valve block having a connecting passage therein and a valve body with ports therein against which the block rides for moving said passage into and out of alignment with said ports so that fluid communications is established between said ports through said connecting passage, comprising:
- a. a single, continuous channel, on the surface of said block contacting said body, surrounding said passage and said ports when said passage is in alignment with said ports; and
- b. means to supply sealant liquid under a low pressure to said channel;
- c. said means to supply sealant liquid comprising a port in

said valve body adopted to be aligned with the channel in said valve block and means to supply sealant liquid under pressure to said port;

d. said last mentioned means comprising

a. an air pump;

b. a column of water;



c. a sealed container of sealant liquid;

d. a line immersed in said sealant liquid coupled to said port in said body; and

e. a line from the outlet of said pump flow coupled to said sealed sealant liquid supply and to said water column whereby the pressure in said sealant liquid will be determined by the height of said water column.

4,022,241

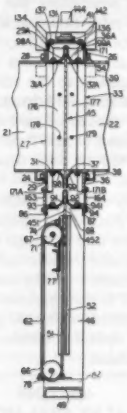
DAMPER SEALING STRUCTURE

Edward L. Fox, Loveland, Ohio, assignor to Air Clean Damper Co., Inc., Cincinnati, Ohio

Filed Nov. 25, 1975, Ser. No. 635,216

Int. Cl.² F16k *3/312*

U.S. Cl. 137—240 **2 Claims**



1. In combination, a pair of aligned duct sections, an assembly of bent plate spring duct seal members forming a seal assembly mounted on each duct section at adjacent ends thereof, a damper plate advanceable between the seal assemblies in sealing relation therewith between a closed position in which the damper plate spans the seal assemblies and an open position, each of the seal assemblies including a plurality of bent plate seal spring members with end portions of the spring seal members adjoining, one lengthwise edge portion of each spring seal member being mounted on the associated duct section, angle-shaped bridge members bridging sections of the adjoining edges adjacent said lengthwise edge portion of each spring seal member, sections of the adjacent edges remote from said lengthwise edge portion being free to flex as the damper plate is advanced and retracted, an enclosure surrounding the seal assemblies to form a chamber surrounding the seal assemblies, and means for blowing into the chamber to prevent escape of contents of the duct sections at the damper plate.

4,022,242

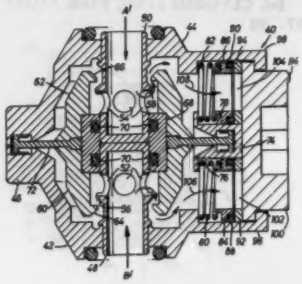
SHOWER CONTROL VALVE ASSEMBLY

Kvetoslav Turecek, Brampton, Canada, assignor to Danfoss A/S, Nordborg, Denmark

Filed Feb. 26, 1976, Ser. No. 661,701

Int. Cl.² F16K *11/02*

U.S. Cl. 137—270 **4 Claims**



1. A shower control valve assembly comprising a casing having optionally reversible hot and cold inlets on opposite sides thereof and an outlet on the top side thereof, a cartridge shell insertable in said casing having first and second separate inlet chambers in respective fluid communication with said casing inlets, wall means for said chambers having first and second valve openings for said first and second chambers, a mixing valve disk rotatably mounted in said cartridge in abutting engagement with said wall means, said casing having a discharge chamber on the side of said disk away from said inlet chambers, said disk having first and second indexed starting positions displaced 180° from each other, said disk having first and second ports cooperable with said valve openings when starting from said first position to sequentially draw (1) cold (2) mixed temperature and (3) hot water from said inlet chambers to said discharge chamber when said first chamber contains hot water, said first and second disk ports being cooperable with said valve openings when starting from said second position to sequentially draw (1) cold (2) mixed temperature and (3) hot water from said inlet chambers to said discharge chamber when said second chamber contains hot water, said valve disk having internal teeth forming a ring gear, a pinion gear engaging said ring gear, and a shaft attached to said pinion gear and extending through said casing.

4,022,243

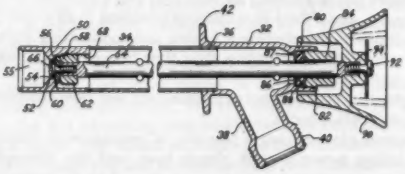
FROST PROOF SILLCOCK

Robert B. Edwards, Niles, Mich., assignor to Nibco, Inc., Elkhart, Ind.

Filed June 1, 1973, Ser. No. 366,149

Int. Cl.² F16K *27/10*

U.S. Cl. 137—360 **6 Claims**



1. A frost proof sillcock comprising an external section having a fluid chamber therein and a discharge opening, and round tubular body connected at one end to said external section and communicating with said chamber, a cylindrical seat end section connected to the other end of said tubular

body and having a cup with smooth inner and outer surfaces for a soldered or brazed pipe joint, said seat end section being joined integrally with said body to form a metal joint therebetween having a substantially higher melting point than a soldered or brazed joint in said cup and containing an internal flange having an opening therethrough, and a valve seat on said flange in axial alignment with said tubular body, and said seat end section further having the same external diameter as said tubular body and being joined to the end surface of said body of electric weld to form a smooth, continuous surface between said body and end section.

4,022,244

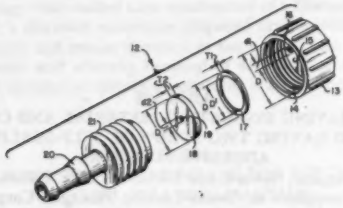
IRRIGATION PURGE VALVE

William S. Oman, 5083 Vanalden, Tarzana, Calif. 91356

Filed Dec. 14, 1973, Ser. No. 424,660

Int. Cl.² F16K *15/14*

U.S. Cl. 137—517 **5 Claims**



1. An irrigation purge valve for connection to the end of a lateral irrigation water line to which a predetermined operating water pressure is applied, said valve comprising:

a. an internally threaded, cylindrical cap having a closed end except for a single small opening of diameter *d*1 between 0.05 and 0.50 the inside diameter D of said cap;

b. means defining an annular shoulder of outside diameter corresponding to the inside diameter of said cap and of inside diameter D' between 0.5 and 0.9 said outside diameter, said shoulder having a thickness T1 between 0.0125 and 0.125, the inside diameter of said cap being disposed at the internal closed end of said cap;

c. a resilient disc of outside diameter corresponding to the inside diameter of said cap and having a single small opening of diameter *d*2 between 0.05 and 0.5 the inside diameter of said cap and a thickness T2 lying between 0.0125 and 0.2 the inside diameter of said cap, said disc being seated on said annular shoulder, the single opening in said closed end of the cap and the single opening in said disc being radially off-set from each other by a distance greater than the sum of their diameters *d*1 plus *d*2, the disc having an outside diameter and thickness value T2 and being of sufficient resiliency that it can flex so that its central area engages the closed end of said cap to completely close off said single small opening in said disc; and

d. a coupling tube having stem means at one end for connection to said lateral and externally threaded at its other end in threaded engagement with the internal threads of said cap,

whereby when the water pressure in said lateral is below a given value, water can pass through the small opening in said disc to the area inside of the shoulder and thence out the small opening in the closed end of said cap and, whereby when said water pressure exceeds said given value, the central area of said disc is moved into at least a portion of the area inside the shoulder to seat against the closed end of the cap and block water flow through the small opening in said disc and thereby block water flow through said cap.

4,022,245

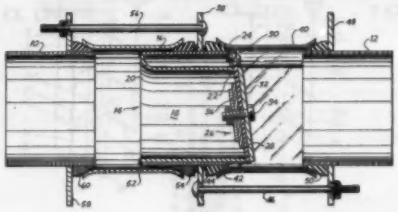
SIGHT CHECK VALVE

Leon E. Davis, Silverton, Tex., assignor to Devin S. Davis, Silverton, Tex., a part interest

Filed Apr. 8, 1976, Ser. No. 675,067

Int. Cl.² F16K *37/00*, *15/14*

U.S. Cl. 137—559 **14 Claims**



1. A visual check valve adapted to be connected in a pipe between

a. an inlet end of the pipe and

b. an outlet end of the pipe;

COMPRISING IN COMBINATION:

c. a valve body having

i. an outer cylindrical shell with an outlet and inlet end equal to the diameter of the pipe,

ii. an inner flow pipe telescoped within the outer shell, and

iii. a filler between the flow pipe and the outlet end of the shell,

d. a flap valve having

i. a closure over the outlet of the flow pipe,

ii. swung from an anchor on the valve body,

e. a peripheral body flange extending around the outer shell,

f. a transparent sleeve

i. of transparent material

ii. with a body end and a pipe end,

iii. the body end telescoped over the outer shell outlet end,

g. a resilient gasket around the outer shell between the transparent sleeve and the body flange,

h. outlet jam means for jamming the transparent band against its gasket, and

j. an inlet sleeve, and

k. inlet means for fluidly sealing the inlet sleeve to the inlet end of the outer shell.

4,022,246

DAMPER ASSEMBLY FOR CLOSING A DUCT FOR HOT GASES

Casper Janse, Leusden, Netherlands, assignor to Forney International, Inc., Carrollton, Tex.

Filed Apr. 21, 1976, Ser. No. 678,785

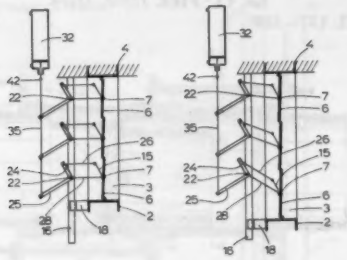
Claims priority, application Netherlands, Apr. 25, 1975, 7504897

Int. Cl.² F24F *13/14*; F23L *13/08*

U.S. Cl. 137—601 **8 Claims**

1. A damper assembly for closing a supply duct suitable for carrying hot gases comprising a damper frame mounted in said supply duct, a plurality of damper blades, a plurality of parallel blade shafts rotatably mounted in said frame and supporting said damper blades, said shafts having shaft ends projecting from said frame at at least one side thereof, blade operating arms secured to the projecting blade shaft ends, and linkage means operatively coupling said blade arms to each other and to an actuating device for opening and closing the damper, characterized in that the linkage means include a plurality of identical ancillary lever means operatively associated with each of said blade arms respectively, and rotatably supported on lever shafts extending parallel to the blade shafts

and mounted on a support member secured outside of said duct, said lever means each having a lever arm of a length equal to the length of the associated blade arm to which it is linked by an operating link, said link having a length such that



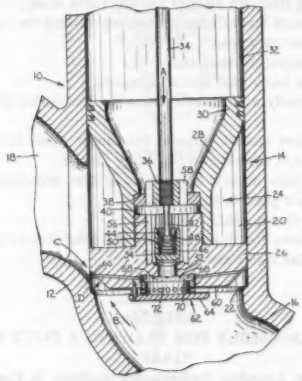
at least under a given temperature condition of the damper frame said lever arm extends parallel to its associated blade arm, the ancillary lever means being connected to each other in parallel position and to the actuating device by a coupling rod.

4,022,247

BALANCED VALVE WITH PRESSURE SENSING MEANS

Raymond Louis Schweitzer, Allison Park; Eugene Robert Then, and Eldert Bergen Pool, both of Pittsburgh, all of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed May 13, 1976, Ser. No. 686,186
Int. Cl.² F16K *1/32*
U.S. Cl. 137—630.13 **9 Claims**



1. An improved pressure balanced valve of the type which includes a body having a cylindrical valve chamber and a pair of flow passages intersecting a lower portion of said cylindrical valve chamber; an annular valve seat between said lower portion and a first of said flow passages and coaxially aligned with said cylindrical valve chamber; a main valve disc assembly mounted for axial movement withinsaid cylindrical valve chamber for selective engagement of a main disc thereof with said seat and further including a concentric body member extending from said main disc away from said seat to terminate at a piston fitting which is slidably received within an upper portion of said cylindrical valve chamber; a coaxially aligned valve stem extending from an operating mechanism located above said valve through said upper portion, said piston fitting and said hollow body to terminate at an auxiliary valve disc; means for communicating a region above said main valve disc assembly with a region below said main disc to substantially control fluid forces acting on the opposite sides of said main valve disc assembly to facilitate opening and closing of said valve regardless of the direction of fluid flow through said valve, which means for communicating includes predetermined axial positioning of said auxiliary valve disc during operation of said valve stem to open and close an axial opening through said main valve disc assembly: wherein said improvement comprises:

at least one pressure sensing passage in said main disc, which said pressure sensing passage extends from a peripheral region of said main disc to a location within said axial opening below said auxiliary valve disc;

said region of said main disc being located within said first passage and adjacent said seat when said main disc engages said seat; and

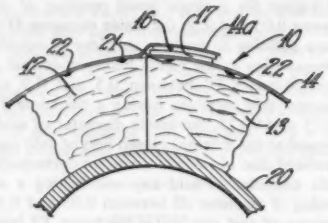
said pressure sensing passage being substantially aligned with said pair of flow passages to generally sense said fluid flow in a direction along a most direct path therebetween when said main valve disc assembly is approaching said seat.

4,022,248

PIPE HAVING INSULATING MATERIAL AND COVER AND HAVING TWO STRIPS OF SELF-SEALING ADHESIVE MATERIAL

Jack J. Hepner, Newark, and Richard S. Hite, Toledo, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 24, 1975, Ser. No. 616,117
Int. Cl.² F16L *9/14, 9/18*
U.S. Cl. 138—141 **23 Claims**



1. In a length of pipe insulation including cylindrically shaped insulating material, a flexible outer cover strip adhesively secured to the insulating material and having an overlapping flap forming one edge portion thereof, the flap being adapted to overlap an oposite edge portion of the cover strip when the insulation is installed on a pipe, and a first strip of adhesive material adhesively secured on one side to the inner side of the flap, having self - sealing adhesive on the other side thereof, and having a protective strip of covering material removably adhered to the self - sealing adhesive on said other side thereof, the improvement comprising a second strip of adhesive material adhesively secured on one side to the outer side of the opposite edge portion of the cover strip, having self - sealing adhesive on the other side thereof, and having a protective strip of covering material removably adhered to the self - sealing adhesive on said other side thereof, the second strip of adhesive material cooperatively engaging the first strip of adhesive material and firmly adhering thereto upon removal of both protective strips and the mere pressing of the strips of adhesive material together after the insulation is installed on a pipe.

4,022,249

FIBROUS TUBE FOR MEMBRANE FILTRATION WITH A TEARING MEMBER

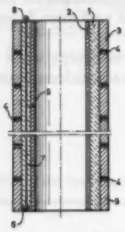
Warner Jan de Putter, Hardenberg, Netherlands, assignor to Wafilin B.V., Zwolle, Netherlands

Filed June 30, 1975, Ser. No. 591,702

Claims priority, application Netherlands, July 3, 1974, 7409029; Sept. 30, 1974, 7412910

Int. Cl.[2] F16L *11/12, 11/02*

U.S. Cl. 138—178 8 Claims



1. A tubular assembly for membrane filtration apparatus comprising a thin-walled tube constructed of a fibrous, porous material, a filtration membrane disposed on the interior wall of said tube and means disposed in the wall of said tube for tearing said wall whereby removal of said tubular assembly from the membrane filtration apparatus is facilitated.

4,022,250

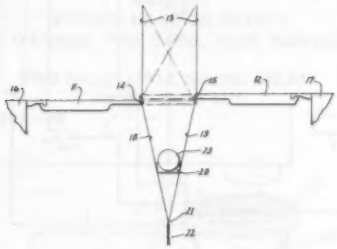
RAPIERS WITH GUIDE MEANS FOR USE IN A VERTICAL WEAVING MACHINE

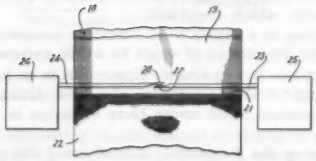
Wayne C. Trost, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed May 14, 1976, Ser. No. 686,651

Int. Cl.[2] D03D *47/18*

U.S. Cl. 139—18 16 Claims





1. A vertical weaving machine comprising means for forming a substantially vertically oriented shed by manipulating warp strands to form sheets which meet at a fell line and a weft inserting rapier, said rapier comprising an elongated member having a shed-penetrating fore-end, a rapier head associated with said shed-penetrating fore-end, and guide means having at least one surface adapted to contact the warp strand sheets above the fell line while said rapier travels in the shed whereby said rapier is guided by the warp strand sheets.

4,022,251

JACQUARD MACHINE HAVING RECIPROCATING GRIFFES AND LIFTING WIRES

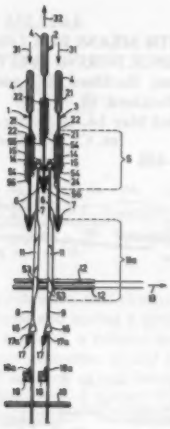
Robert Bucher, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 20, 1976, Ser. No. 650,697

Claims priority, application Switzerland, Jan. 31, 1975, 1202/75

Int. Cl.[2] D03D *3/00, 3/08*

U.S. Cl. 139—59 7 Claims



1. A jacquard machine comprising

a plurality of lifting hooks, each said lifting hook having a drive neb;

a plurality of jacquard needles, each said needle being positioned to press against a respective lifting hook within a pressing zone of said lifting hook; and

a plurality of reciprocating griffes, each said griffe having a blade for engaging with a neb of a respective lifting hook and at least one projecting means, said projecting means being located opposite a neb of an adjacent lifting hook during pressing of said adjacent lifting hook for guiding of said opposed neb thereon.

4,022,252

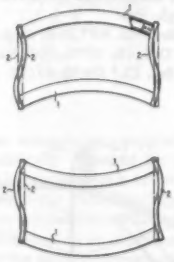
HEDDLE FRAME FOR A HIGH SPEED WEAVING MACHINE

Hiroshi Ogura, Sakai, Japan, assignor to Maruyama Seisakusho Kabushiki Kaisha, Osaka, Japan

Filed Feb. 5, 1976, Ser. No. 655,461

Int. Cl.[2] D03C *9/06*

U.S. Cl. 139—91 7 Claims



1. A heddle frame of a high speed weaving machine comprising:

a side stay having a metallic core, one portion of said core being free to slide in a guiding groove of means for guiding the heddle frame and another portion of said core being covered with a flexible reinforcing material to provide additional strength;

a pair of integrally formed synthetic resin joining pieces projecting from the flexible, strengthened portion of said core of said side stay and forming a tapered groove therebetween;

a hollow metallic cross beam for receiving said synthetic resin projecting pair of joining pieces therein; and

wedge means, for pressing said synthetic resin joining pieces outwardly, being mounted in the tapered groove formed by said pair of synthetic resin joining pieces.

4,022,253

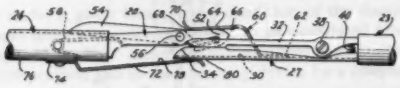
RAPIERS WITH MEANS FOR LIMITING RAPIER HEAD DIVERGENCE DURING WEFT-YARN TRANSFER

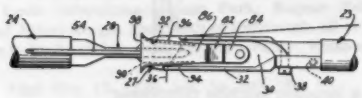
Wayne C. Trost, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill.

Filed May 14, 1976, Ser. No. 686,652

Int. Cl.² D03D *47/20*

U.S. Cl. 139—446 **13 Claims**





1. In a weft inserting mechanism of a vertical weaving machine having a pair of reciprocating opposed cantilevered rapiers for inserting weft strands into warp sheets by transferring an end of a weft strand from the shed-penetrating end of a entry rapier to the shed-penetrating end of an exit rapier in said warp sheds, a rapier comprising an elongated member, a shed-penetrating fore-end on said member, said fore-end comprising guide means for receiving and guiding a portion of the other of said rapiers, said guide means having a sloping frontal surface adapted to engage a portion of the other of said rapiers to correct misalignment of the rapiers, whereby said guide means limits divergence of said shed-penetrating ends as they come together for weft strand transfer.

4,022,254

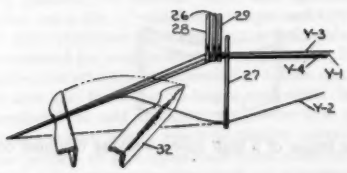
WEFT YARN CONTROL DEVICE

Richard L. Volpe, Hopedale, and Claude Wheeler, South Grafton, both of Mass., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 607,566, Aug. 25, 1975. This application Oct. 18, 1976, Ser. No. 733,569

Int. Cl.² D03D *47/38*

U.S. Cl. 139—453 **4 Claims**



1. In a mechanism for selectively positioning in a shuttleless loom any one of a plurality of weft yarns drawn from separate sources of supply in a position for insertion as single picks into separate warp sheds by a suitable carrier, the improvement comprising:

a. a weft positioner for each source of weft mounted on the loom intermediate the latter and the edge of the fabric being formed and arranged for individual selective movement between an inactive position in which the weft yarn is out of position to be taken by the carrier and an active position in which the selected weft yarn is positioned to be taken by the carrier;

b. means carried by the loom in operative association with said weft positioners and the edge of the fabric to which the weft yarns are connected for effecting positive separation of the selected weft yarn from those in their inactive positions; and

c. means for moving said separation means between operative and inoperative positions in timed sequence with the weaving cycle.

4,022,255

METHOD FOR FILLING A REACTOR WITH SOLID PARTICLES

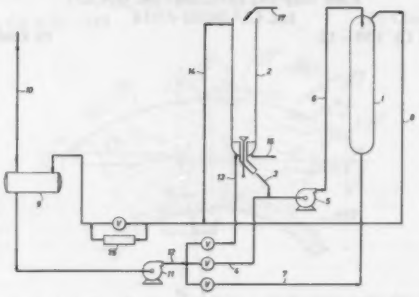
Abraham A. Pegels, The Hague, and Hendrik J. Scheffer, Amsterdam, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 17, 1975, Ser. No. 623,272

Claims priority, application Netherlands, Oct. 17, 1974, 7413636

Int. Cl.² B65B *1/04*

U.S. Cl. 141—1 **6 Claims**



1. A process for filling a reactor with at least one homogeneous bed of solid particles, the dimensions of which lie within narrow limits, which comprises:

a. fluidizing in a supply zone a mixture consisting of particles the dimensions of which lie within narrow limits and of particles having smaller dimensions in an inert fluidizing liquid until the particles of smaller dimensions have accumulated in an upper layer or layers in the supply zone;

b. stopping the fluidization and allowing the particles to settle;

c. removing the upper layer or layers of the settled particles;

d. introducing at least part of the remainder of the settled particles in the supply zone as a slurry in an inert liquid into a reactor, and bringing the introduced particles into a state of incipient fluidization by means of an inert fluidizing liquid stream;

e. reducing or discontinuing the rate of flow of the inert fluidizing liquid stream; and

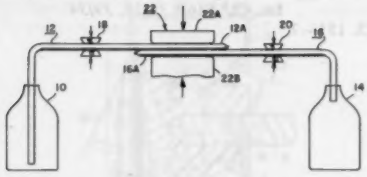
f. allowing the particles to settle.

4,022,256

ASEPTIC FLUID TRANSFER SYSTEM

Richard M. Berkman, Pasadena; James C. Arnett, La Canada, and Edward L. Cleland, Duarte, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 602,271, Aug. 6, 1975, abandoned. This application Sept. 25, 1975, Ser. No. 616,765
Int. Cl.² B65B 3/04
U.S. Cl. 141—1 26 Claims



1. A method for enabling an aseptic transfer of a fluid which is in one sterile container to another sterile container, comprising

forming a connector portion of both containers out of a material which will melt and flow at a predetermined temperature,

placing two predetermined lengths of said two portions in contact with one another,

applying heat and pressure at said melting and flowing temperature, to predetermined areas of said connector portions within the lengths which are in contact to cause the material of said connector portions to flow away from said area to the regions around said area, to form a communicating opening over said areas between said contacting portions while maintaining sterile and closed all other regions of said portions, and

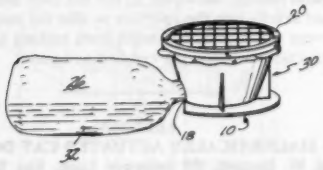
cooling the areas of said connector portions whereby a sterile passageway is created through said portions for transferring fluid from one container to another.

4,022,257

FUNNEL-DRAINER DEVICE

Daniel J. O'Connell, 5906 Colfax, North Hollywood, Calif. 91601

Filed Dec. 15, 1975, Ser. No. 640,559
Int. Cl.² B65B 3/06
U.S. Cl. 141—98 8 Claims



1. A device for collecting waste liquids and the like comprising:

a. A self-supporting, funnel shaped container having a side wall, said side wall defining an upper inlet configured to permit said liquid to pass therethrough, closed bottom member for supporting said container, and an outlet, said outlet being provided in said side wall; and

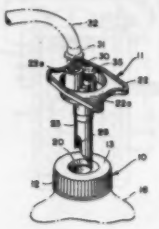
b. A removable receptacle for collecting said liquid, said receptacle coupled to said container adjacent said outlet such that said liquid flows through said outlet into said receptacle, said receptacle being coupled to said container by a coupling means, said coupling means for selectively coupling said receptacle to said container such that when said liquid has passed through said container and into said receptacle, said receptacle is selectively removable therefrom.

4,022,258

PORTED CLOSURE AND CONNECTOR THEREFOR

Roy B. Steidley, Ellington, Conn., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 28, 1975, Ser. No. 626,201
Int. Cl.² B65D 41/50
U.S. Cl. 141—330 24 Claims



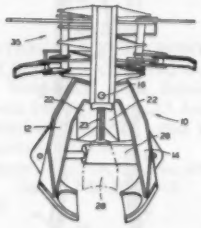
1. A closure for fluid containers, said closure being formed of semi-rigid plastic material and having a generally cylindrical side wall, an annular top wall, a tubular sleeve extending downwardly from the inner perimeter of said top wall, and a bottom wall closing the lower end of said tubular sleeve, said tubular sleeve and said side, top and bottom walls being integrally formed of semi-rigid plastic material, said side wall having threads along the inner surface thereof for threadedly engaging the neck of a fluid container, said sleeve being substantially smaller in diameter than said side wall and having integral annular sealing means spaced below the level of said top wall.

4,022,259

TREE SHEAR

Charles Robert Sturtz, Jr., Romulus, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

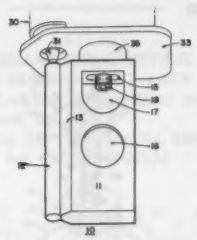
Filed Mar. 24, 1976, Ser. No. 670,034
Int. Cl.² A01G 23/02
U.S. Cl. 144—34 E 5 Claims



1. A timber shear comprising a support structure, a pair of shear arms symmetrically disposed on opposite sides of a horizontal pivot axis provided at a lower end of the support structure, the shear arms extending downwardly from the support structure in substantial vertical alignment therewith, each of the shear arms having its upper end pivotally mounted on opposite sides of the pivot axis, respective lower ends of the shear arms having a pair of horizontally disposed shear blades protruding forwardly of the shear arms and rigidly connected thereto, the shear blades arranged in confronting arrangement with each other to shear a tree when they are moved toward each other, and actuating means mounted on the shear arms and substantially underlying the pivot axis thereof, the actuating means disposed between the pivot axis and the shear

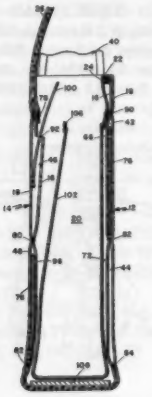
blades, said means selectively moving the shear arms and the shear blades thereon away from and toward each other.

4,022,260
LAMINATE TRIMMER GUIDE
Ralph Wilson, 240 W. 36th, Boise, Idaho 83764
Filed June 17, 1976, Ser. No. 697,140
Int. Cl.² B27C *5/10*
U.S. Cl. 144—134 D **5 Claims**



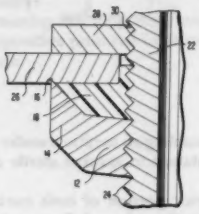
1. A laminate trimmer guide comprising:
a substantially rectangular frame adapted to be hand held and including at its uppermost terminal edge, attachment means for attaching the guide to a base plate of a laminate trimmer, and
a cylindrical cutter alignment rod, vertically secured to one edge of said frame parallel with the sides thereof.

4,022,261
HANDBAG WITH DISPLAY POCKETS
Dorothy Burnham Russell, 802 Elmwood Drive, Escondido, Calif. 92025
Filed Aug. 24, 1976, Ser. No. 717,156
Int. Cl.² A45C *3/06*
U.S. Cl. 150—28 A **12 Claims**



1. A picture display handbag comprising:
front and back pliable panels secured together for defining a cavity for containing a plurality of articles,
at least one of said front and back panels comprising inner and outer sheets of pliable material secured together along a plurality of intersecting vertical and horizontal lines defining a plurality of pockets, said outer sheet of pliable material being transparent,
said inner sheet having a slit extending across each pocket adjacent to and parallel to the upper edge thereof for defining an opening into each of said pockets, and
an inner lining shaped to conform generally to said cavity for covering said inner sheet and detachably secured to said inner sheet along a line parallel to and adjacent the upper edge thereof.

4,022,262
SEALING LOCKNUT
Donald J. Gunn, Baldwinsville, N.Y., assignor to Crouse-Hinds Company, Syracuse, N.Y.
Continuation of Ser. No. 521,803, Nov. 7, 1974, abandoned.
This application Apr. 9, 1976, Ser. No. 675,409
Int. Cl.² F16B *39/28, 39/34*
U.S. Cl. 151—7 **1 Claim**



1. A sealing locknut for use with electrical conduits, boxes and the like to provide a fluid tight grounded connection comprising an annular nut having a central threaded aperture and a plurality of axially directed teeth disposed about the circumference of the nut in spaced relation to each other, said teeth being spaced apart by a distance at least equal to the circumferential width of a tooth and an annular resilient sealing ring means integrally secured to the side of the nut on which the teeth extend, said ring means having a smooth cylindrical inner surface and extending in the radial direction from the crest of the threads in the central aperture to the base of the teeth and in the axial direction from the side of the nut to a point beyond the axial extent of the teeth and wherein the ratio of the cross-sectional area of the sealing ring to the cross-sectional area encompassed by the side of the nut and an imaginary line representing an axial extension of the thread crest and an imaginary radial line extending inwardly from the axial directed ends of said teeth is greater than unity whereby said ring means will be substantially unconfined in the radially outward direction and will have sufficient material so that upon compression of the sealing ring as the integral nut and sealing ring are threaded on a conduit against a panel having an aperture through which the conduit extends the sealing ring will expand radially outwardly to but not over the ends of said teeth and axially into the aperture so that the sealing ring will not prevent the ends of said teeth from making a good electical connection between the conduit and panel.

4,022,263
MAGNETICALLY ACTUATED CAT DOOR
Richard W. Beckett, 59 Sulgrave Lane, San Rafael, Calif. 94901; Marian P. McBride, 630 St. Francis Blvd., San Francisco, Calif. 94127, and Michael B. Johnson, 2198 Rosita Ave., Santa Clara, Calif. 95050
Filed Sept. 2, 1976, Ser. No. 719,904
Int. Cl.² E06B *3/32*
U.S. Cl. 160—92 **5 Claims**

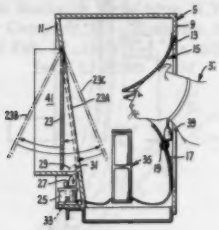
1. An automatic door permitting ingress and egress of an animal wearing a magnet and not permitting such movement in the absence of a magnet, comprising in combination:
a. a chamber having a first wall representing the outside of a dwelling or the like and a second wall representing the inside wall of such a dwelling;
b. a door in said first wall, said door being openable by an animal pressing against the wall,
c. a normally open magnet responsive switch in said door

whereby an animal entering said door will cause said switch to close,

d. a door in said second wall hinged from the top, said door being normally held in a closed position by a magnetic solenoid latch,

e. biasing means, normally holding said door against said latch and preventing movement of the door;

f. power supply means in series with said magnetic switch and said solenoid whereby the presence of a magnet



adjacent said magnetic switch will cause said solenoid to withdraw said latch, permitting said door to swing to a partially open position,

g. said door being swingable to a fully opened position upon the passage of said animal,

h. gravity causing said door upon being swung open to swing back and be recaught on said latch and

i. said door being swingable toward said front wall to permit an animal to exit from said door.

4,022,264

ELECTROSLAG REFINING

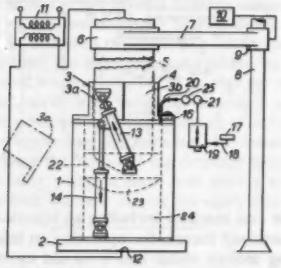
Geoffrey Hoyle, Sheffield, England, assignor to British Steel Corporation, London, England

Filed Oct. 6, 1975, Ser. No. 620,186

Claims priority, application United Kingdom, Nov. 4, 1974, 47528/74

Int. Cl.² B22D *27/00*

U.S. Cl. 164—52 **7 Claims**



1. In electroslag refining apparatus for remelting an electrode fabricated from the metal to be refined in the absence of hydrogen in atmospheric moisture and comprising a cooled mould provided with a cover having an opening through which the electrode can be lowered into the mould, the improvement which comprises drier means for receiving and drying air from the atmosphere, means for conveying dried air from said drying means to the interior of the upper section of the mould, the arrangement being such that during operation of the apparatus only the dried air from the drier means is admitted to the interior of the said upper section of the mould whereby the presence of hydrogen in atmospheric moisture is avoided.

4,022,265

METHOD FOR ENLARGING THE WIDTH OF A CAST PIECE IN A CONTINUOUS CASTING OPERATION

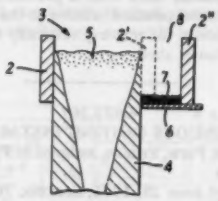
Riyota Takahasi; Takayosi Yamada; Makoto Kimura, and Seiji Yosikawa, all of Tohkai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed June 10, 1975, Ser. No. 585,505

Claims priority, application Japan, June 12, 1974, 49-67006

Int. Cl.² B22D *11/06*

U.S. Cl. 164—73 **6 Claims**



1. A method for enlarging the width of a cast piece formed in a continuous metal casting operation wherein molten metal is poured into one end of a mold comprised of a pair of opposed longitudinal walls and a pair of transverse walls extending between said longitudinal walls in contact therewith, and a cast piece is withdrawn from the other end of said mold, said method comprising

stopping the pouring of molten metal into said mold and simultaneously the withdrawal of the cast piece from said mold, to maintain the molten metal surface level,

moving at least one of the transverse walls of said mold to enlarge the mold cavity while maintaining said transverse wall in contact with said longitudinal walls, and positioning a supporting plate under said mold in a disposition so as to underlie the enlargement in said mold cavity,

placing a cooling agent on top of said supporting plate within the mold cavity enlargement,

pouring molten metal into said one end of said mold and enlarged cavity part thereof,

removing said supporting plate from under said mold, and

thereafter, beginning withdrawing an enlarged cast piece from the other end of said mold.

4,022,266

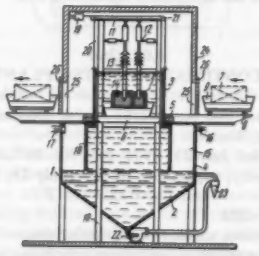
INSTALLATION FOR ELECTROHYDRAULIC KNOCKOUT OF CASTING CORES

Georgy Ottovich Vershinsky, ulitsa Bairona, 6/20, kv. 2; Evgeny Alexeevich Perfiliev, ulitsa 23 Avgusta, 26, kv. 32, and Georgy Dmitrievich Kharlan, ulitsa Turgenevskaya, 7, kv. 5, all of Kharkov, U.S.S.R.

Filed June 14, 1976, Ser. No. 696,044

Int. Cl.² B22D *29/00*

U.S. Cl. 164—250 **4 Claims**



1. An installation for electrohydraulic knockout of casting

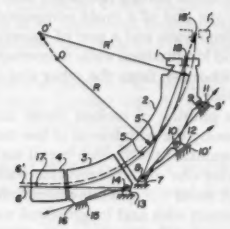
cores comprising: a liquid in the form of a container shell consisting of a movable upper part and a fixed lower part, both parts being jointed telescopically with each other so that in the extended position the space of the upper part supplements that of the lower part and communicates with it; a pneumatic seal located on the joint between said parts of said shell; a casting support located practically level with the upper face of said lower part of the container shell and fixed rigidly in position; a mechanism for delivering the casting on, and removing it from, said support; at least one electrode holder mounted above said container shell with a provision for moving the electrode to a preset position relative to the casting core; and a hydraulic cylinder for moving vertically the upper part of said liquid container shell.

4,022,267

CONTINUOUS CASTING INSTALLATION

Joseph Pietryka, Paris, France, assignor to Fives-Cail Babcock, Paris, France

Filed June 28, 1976, Ser. No. 700,086
Claims priority, application France, July 2, 1975, 75.20723
Int. Cl.² B22D *11/12*
U.S. Cl. 164—260 **3 Claims**



1. In a continuous casting installation including an oscillating mold adapted for downwardly discharging a stream of partly solidified metal during operation of the installation, and a curved roll rack mounted for receiving said stream from the mold and defining a path guiding the stream from a substantially vertical toward a substantially horizontal direction of movement, the rack having two sections consecutively arranged along said path and each having a first terminal portion adjacent the first terminal portion of the other section and a second terminal portion remote from the other section, said sections of said rack being supported on a support, and said mold being secured to the second terminal portion of one of said sections upwardly offset from the other section, the improvement which comprises:

1. pivot means securing each of said first terminal portions to said support for angular movement about a horizontal axis; and
2. bearing means interposed between each of said second terminal portions and said support for sliding movement of each second portion relative to said support in a plane parallel to the associated horizontal axis.

4,022,268

CONTINUOUS CASTING PLANT

Stefan Biricz, Linz, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

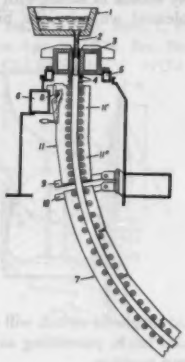
Filed July 21, 1975, Ser. No. 597,666
Claims priority, application Austria, July 25, 1974, 6113/74
Int. Cl.² B22D *11/12*
U.S. Cl. 164—282 **7 Claims**

1. A continuous casting plant comprising:

a supporting structure with upwardly open hooks;

a strand guiding means with supporting and guiding rollers, said guiding means being provided with generally horizontal bolts at its upper end, said bolts being suspendible in the hooks of the supporting structure;

at least one latch with a hook-shaped end being pivotably secured to the supporting structure by means of a pivot bearing, said latch engaging said bolts with its hook-shaped end when in a vertical closing position so as to close off the upwardly open hooks; and



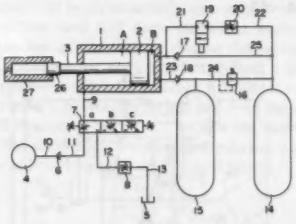
means for maintaining the latch in said vertical closing position so as to secure the bolts against being lifted out of the hooks, said latch being rotatable out of the vertical position to permit the release of the bolts from the hooks, thereby permitting removal of the strand guide means from the supporting structure by an upward motion of the guide.

4,022,269

DIE CAST MACHINES

Kazuyoshi Segawa, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed July 23, 1976, Ser. No. 708,216
Claims priority, application Japan, July 31, 1975, 50-94083
Int. Cl.² B22D *17/08*
U.S. Cl. 164—314 **9 Claims**



1. In a die cast machine including an injection cylinder and a piston contained therein for operating an injection plunger for injecting molten metal into a mould cavity, said piston dividing the interior of said cylinder into a fore chamber and a rear chamber, means for admitting pressurized gas from gas accumulator means into said rear chamber for advancing said piston and said injection plunger for injecting the molten metal into said mould cavity, and means for admitting pressurized liquid into said fore chamber to retract said piston thereby forcing the gas in said rear chamber back into said gas accumulator means, the improvement which comprises a control valve means connected in the discharge path of said pressurized liquid from said fore chamber, means for controlling the flow quantity of the pressurized liquid dicharged from said fore chamber and flowing through said control valve means in accordance with the position of said piston during

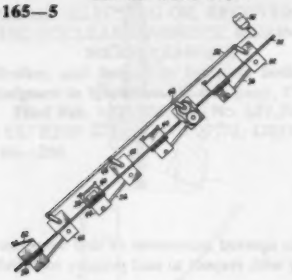
the forward movement threof, thereby varying the speed of said piston, a plurality of gas accumulators, rear valve means connected between the rear chamber of said injection cylinder and said plurality of gas accumulators, and means for controlling said rear valve means so as to adjust the rate of increase of the pressure applied to the molten metal at the final stage of the injection casting operation.

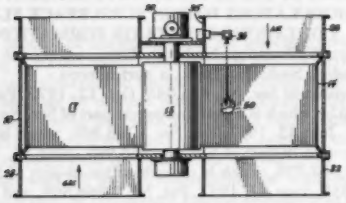
4,022,270

FIRE DETECTOR SCANNING ARRANGEMENT

Richard Franklin Stockman, Friendship, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Feb. 17, 1976, Ser. No. 658,147
Int. Cl.² F28D *19/04*
U.S. Cl. 165—5 **5 Claims**





1. A heat exchanger housing including inlet and outlet ducts for a heating fluid and for a fluid to be heated, a matrix of heat absorbent material carried in said housing, means for alternately subjecting said matrix to the heating fluid and the fluid to be heated, an infra-red ray detecting means positioned in the housing to view the infra-red rays emitted by the matrix, an opening in said housing adapted to receive the infra-red ray detecting means, an air lock having an enclosure with an open side thereof in common with the opening of said housing, a pivotal carrier supporting the infra-red ray detecting means, and means moving the infra-red ray detector from a position within said housing where it faces said matrix to a position within said air-lock where it covers the open side thereof.

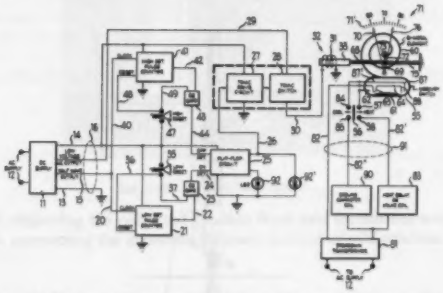
4,022,271

ELECTRONIC TEMPERATURE CONTROLLER AND SWITCHING DEVICE

Brian J. Monahan, 28895 Cragmont Drive, Evergreen, Colo. 80439

Filed Nov. 26, 1975, Ser. No. 635,762
Int. Cl.² G05D *23/32*
U.S. Cl. 165—12 **15 Claims**

1. A temperature control system comprising: manually operable temperature level setting means for setting two temperature values for two temperature level control points identifying the desired temperatures at which a given environment is to be approximately maintained during different time intervals in a day; temperature responsive means which is to have a control condition when the temperature of the environment reaches the selected temperature control point; temperature level preparing means which in a first condition thereof adjusts said temperature responsive means so it assumes said given control condition when the temperature of the environment is at the selected low temperature control point and in a second condition thereof adjusts said temperature responsive means so it assumes said control condition when the temperature of the enviornment is at the selected high temperature control point; and timer means for controlling the time of operation of said temperature level preparing means to said first and second conditions thereof comprising: manually operable timer control means operable to at least two differ-



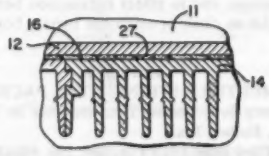
ent conditions, means responsive to the particular moment when said timer control means is operated to one of said conditions for generating a first control signal every 24 hours from the moment said control member is momentarily moved to said one condition, means responsive to the particular moment when said timer control means is operated to the other condition for generating a second control signal every 24 hours from the moment said timer control means is momentarily operated to said other control condition, and signal responsive means responsive to the time of generation of said first and second control signals for respectively operating said temperature level preparing means to said first and second conditions thereof.

4,022,272

TRANSMISSION FLUID HEAT RADIATOR

Bernard Miller, Portuguese Bend, Calif., assignor to Chester O. Houston, Jr., Corona del Mar, Calif., a part interest

Filed Nov. 14, 1975, Ser. No. 631,827
Int. Cl.² F01M *5/00;* **F01P** *11/08;* **F16N** *39/02;* **F16H** *57/04*
U.S. Cl. 165—51 **4 Claims**



1. A transmission fluid heat radiator comprising, in combination:

a. a transmission fluid pan serving as a reservoir for transmission fluid and having a flat bottom;

b. an extruded member of high heat conductivity constituting a base with bottom and top surfaces, the bottom surface being defined by a series of integral parallel heat radiating fins extending downwardly in a direction normal to the plane of the base, the top surface being flat and in juxtaposed relationship to said flat bottom of said pan; and,

c. a thermally conductive cement between said flat bottom of said pan and said top surface of said member securing the same to said pan

whereby heat from transmission fluid in said pan is thereby conducted to said member by said thermally conductive cement and radiated by said fins.

4,022,273

BOTTOM HOLE FLOW CONTROL APPARATUS

Anil Marathe, Huntington Beach, Calif., assignor to Cook Testing Co., Long Beach, Calif.

Filed Oct. 10, 1975, Ser. No. 621,588
Int. Cl.² E21B *43/00, 33/12, 43/12*
U.S. Cl. 166—65 R **10 Claims**

1. A tubing string mounted flow control apparatus, comprising:

a. a tubing string suspended packer adapted to be set in a well casing and having a main bore forming a continuation of the tubing string, a bypass bore, an inlet connecting the bypass bore and main bore near their upper ends and communicating with the region below the packer, and an outlet from the main bore communicating with the region above the packer between the tubing string and surrounding well casing;

b. and tubular means removably received in the main bore and forming a flow passage through the main bore, the tubular means including tubular valve elements relatively movable axially to isolate the inlet and outlet from the flow passage, and to effect connection between the inlet and outlet to close or open the bypass bore.

4,022,274

MULTIPLE STRING WELL PACKER

Marion Barney Jett, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed June 15, 1976, Ser. No. 696,447
Int. Cl.² E21B *23/00*
U.S. Cl. 166—118 **10 Claims**

6. A dual string, mechanically operated, oil well packer comprising:

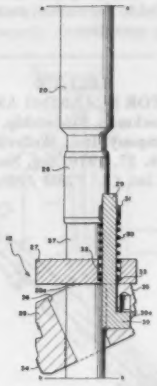
a primary mandrel assembly;

a secondary mandrel assembly;

resilient packer means mounted on said mandrel assemblies;

a unitary tubular gripping member partially rotatably mounted on said mandrel assemblies and having gripping teeth formed thereon;

tension setting means on said well packer for axially compressing said packer means into radial contact with a wellbore casing and partially rotating said gripping member to engage said teeth with a wellbore casing in response to upward movement of said secondary mandrel assembly with respect to said primary mandrel assembly.

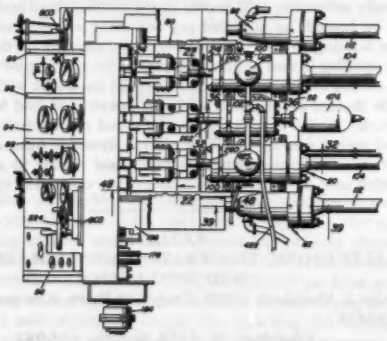


4,022,275

METHODS OF USE OF SONIC WAVE GENERATORS AND MODULATORS WITHIN SUBSURFACE FLUID CONTAINING STRATA OR FORMATIONS

Clarence W. Brandon, Nashville, Tenn., assignor to Orpha B. Brandon, Nashville, Tenn., a part interest

Division of Ser. No. 406,045, Oct. 12, 1973, Pat. No. 3,981,624, which is a continuation-in-part of Ser. No. 611,082, Jan. 23, 1967, Pat. No. 3,765,804, which is a continuation-in-part of Ser. No. 665,995, June 17, 1957, Pat. No. 3,302,720, which is a continuation-in-part of Ser. Nos. 296,038, June 27, 1952, Pat. No. 2,866,509, and Ser. No. 241,647, Aug. 13, 1951, Pat. No. 2,796,129. This application July 6, 1976, Ser. No. 702,655
Int. Cl.² E21B *37/00, 43/24, 43/26, 43/27*
U.S. Cl. 166—249 **93 Claims**



1. That method of maintaining a predetermined pressure upon a fluid medium and thereby transmitting a sonic wave between a sonic wave generator and a means of reception comprising

oscillating a valve in head piston between a compressible energy storage means and a column of pressured fluid contacting said means of sonic wave reception,

making up losses in the predetermined pressure of said fluid

medium by admittance of additional fluid through said piston valve from a source of pressured fluid during accelerated rarefaction oscillations of said piston against said compressible energy storage means,

adding said additional fluid into said fluid medium during compressional oscillations of said piston,

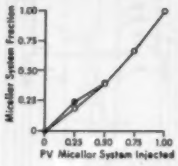
including increasing the pressure being maintained on said fluid medium column by increasing the accelerations imposed on said rarefaction oscillations,

wherein said means of reception is an oil, gas or water containing subsurface strata or formation.

4,022,276
METHOD OF SELECTING OIL RECOVERY FLUIDS USING NUCLEAR MAGNETIC RESONANCE MEASUREMENTS

Karl D. Dreher, and Robert D. Sydansk, both of Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Feb. 13, 1976, Ser. No. 657,784
Int. Cl.² E21B *47/00;* **G01N** *27/78;* **G01R** *33/08*
U.S. Cl. 166—250 **8 Claims**



5. The process of designing fluids for injection comprising contacting a porous matrix substantially representative of a fluid-bearing subterranean formation containing fluids having nuclei detectable by nuclear magnetic resonance measuring devices, determining the NMR response of each nuclei-bearing fluid in association with said matrix, determining the NMR response of each fluid or component thereof to be brought into contact with the matrix, determining the NMR response of each such fluid or component thereof brought into contact with the matrix while in contact with fluids in association with said matrix, and contacting the formation with fluid which substantially meets predetermined criteria for interaction of the fluid(s) for injection with the matrix and/or fluid associated with the matrix, as established by said NMR response-determining steps.

4,022,277
IN SITU SOLVENT FRACTIONATION OF BITUMENS CONTAINED IN TAR SANDS

Willis G. Routson, Walnut Creek, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 19, 1975, Ser. No. 578,778
Int. Cl.² E21B *43/22*
U.S. Cl. 166—267 **10 Claims**

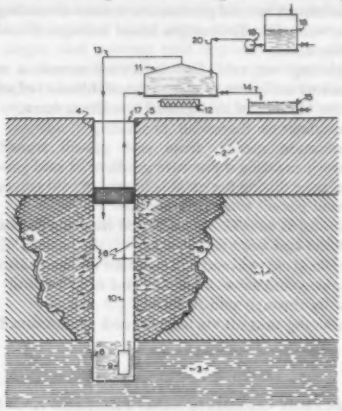
1. An in-situ solvent fractionation process for recovering bitumens from unconsolidated tar sands, said process consisting essentially of

1. introducing hot solvent vapors in a formation consisting essentially of a bitumen-containing tar disposed among discrete sand particles,

said vapors being so composed and at such a temperature as to condense, upon contact with unfractionated tar in said formation, to form a liquid and to selectively dissolve bitumens out of said tar as a more soluble fraction,

2. allowing the resultant solution of bitumens to drain below the level at which said hot vapors contact unfractionated tar and collecting it,

thereby leaving in place a less soluble bituminous fraction of said tar as an undissolved residue capable of supporting itself and the sand particles among which it is disposed;



TAR SAND PRODUCTION SCHEME

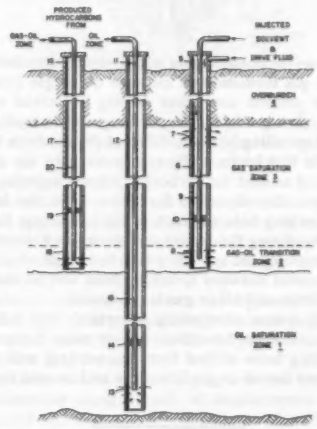
3. removing the collected solution from said formation; and

4. recovering the dissolved bitumen content of said solution.

4,022,278
RECOVERY OF OIL BY A VERTICAL MISCIBLE FLOOD

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,155
Int. Cl.² E21B *43/16, 43/22*
U.S. Cl. 166—269 **15 Claims**



1. A method for the recovery of oil from a subterranean oil-bearing reservoir having an oil saturation zone, a gas-oil transition zone, and a gas saturation zone wherein a slug or blanket of solvent miscible with said oil is driven downwardly through said reservoir by a drive agent, thereby displacing said oil downwardly through said reservoir, comprising the steps of:

a. providing a first injection means extending into said reservoir adjacent said gas-oil transition zone for injection of said solvent into said reservoir,

b. providing a second injection means extending into said reservoir adjacent said gas saturation zone for injecting said drive agent into said reservoir,

c. providing a first production means in spaced relation to

said first injection means and adjacent said gas-oil transition zone,

d. providing a second production means extending into said reservoir and adjacent the lower horizon of said oil saturation zone,

e. injecting via said first injection means a solvent in amounts sufficient to establish said blanket of said solvent in the vicinity of said gas-oil transition zone,

f. simultaneous therewith producing fluids via said first production means, from said gas-oil transition zone thereby creating a pressure gradient at said gas-oil transition zone during the establishment of said solvent blanket at said gas-oil transition zone,

g. shutting in said first production means after said solvent blanket has been established,

h. injecting via said second injection means a drive agent to displace said solvent blanket and said reservoir oil downwardly through said reservoir,

i. producing said oil via said second production means.

4,022,279

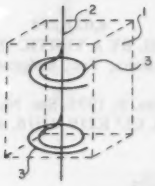
FORMATION CONDITIONING PROCESS AND SYSTEM

W. B. Driver, 19 Sheridan Road, Arnold, Md. 21012

Continuation-in-part of Ser. No. 486,875, July 9, 1974, abandoned. This application Dec. 23, 1974, Ser. No. 535,590

Int. Cl.² E21B *43/14, 43/20, 43/24, 43/26*

U.S. Cl. 166—271 **20 Claims**



1. A process for conditioning and applying stimulating fluids to an oil or gas formation to increase oil or gas production, wherein the process comprises drilling a vertical well hole through an oil or gas formation, drilling one or more horizontal outward spiralling holes at different depths from the vertical well hole that horizontally spirals out into the oil or gas formation and around the vertical well hole, injecting fracturing fluids into the oil or gas formation from the horizontal outward spiralling hole to fracture the oil or gas formation, injecting stimulating fluids into the oil or gas formation from the horizontal outward spiralling hole to induce oil or gas flow to the horizontal outward spiralling hole and to the vertical well hole where said oil or gas is produced.

4. A well system comprising a vertical well hole drilled through an oil or gas formation, one or more horizontal outward spiralling holes drilled from the vertical well hole that spiral out into the oil or gas formation and around the vertical well hole.

4,022,280

THERMAL RECOVERY OF HYDROCARBONS BY WASHING AN UNDERGROUND SAND

Xerxes T. Stoddard, 4617 W. 27th Ave., Denver, Colo. 80212, and Ruel C. Terry, 3090 S. High St., Denver, Colo. 80210

Filed May 17, 1976, Ser. No. 686,995

Int. Cl.² E21B *43/24, 33/138*

U.S. Cl. 166—272 **8 Claims**

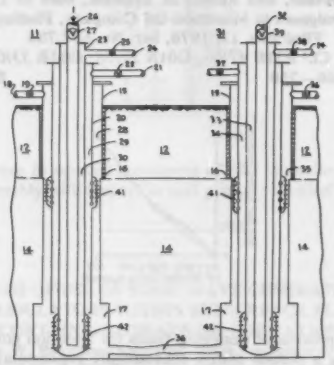
1. A method of mobilizing and producing an immobile petroleum located in an underground formation comprising the steps of

drilling two or more wells from the surface of the earth into an immobile petroleum deposit,

establishing a hermetic seal in each of said wells between the underground petroleum deposit and the surface of the earth,

establishing four communication passages in each well between the surface of the earth and the underground petroleum deposit, the first communication passage of the said four communication passages being the annulus between a casing and a liner set within the said casing, the second communication passage of the said four communication passages being the annulus between the said liner and a pipe set within the said liner, the third communication passage of the said four communication passages being the annulus between the said pipe and a tubing set within the said pipe, the fourth communication passage of the said four communication passages being the communication passage within the said tubing,

establishing a communication passage between each of the said wells through the underground petroleum deposit,



circulating a heat carrier fluid from the surface of the ground through the said fourth and third communication passages in the first well, through the underground petroleum deposit, withdrawing the circulating heat carrier fluid and flowable petroleum through one or more communication passages in the second well, and withdrawing the flowable petroleum through the said second communication passage in the said first well,

circulating a coolant fluid within the said first communication passage of the said first well, the said coolant fluid being at a temperature less than the temperature of the said heat carrier fluid, and the said coolant fluid being of a lower specific gravity than the said heat carrier fluid, and

capturing and saving the petroleum at the surface of the ground.

4,022,281

METHOD AND APPARATUS FOR ORIENTING EQUIPMENT IN A WELL

Michael Derek Pennock, Pinner, England, assignor to The British Petroleum Company Limited, London, England

Filed Apr. 13, 1976, Ser. No. 676,529

Claims priority, application United Kingdom, Apr. 18, 1975, 16066/75

Int. Cl.² E21B *23/00*

U.S. Cl. 166—315 **8 Claims**

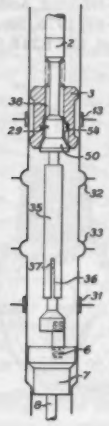
1. An apparatus for installation in a handling string to orientate equipment by means of the rams of a B.O.P. stack which apparatus comprises:

an elongate member adapted to be connected in a handling string, the elongate member having a second member thereon which second member is moveable axially with respect to the elongate member and has means co-operating with corresponding means on the elongate member to prevent relative rotation, the second member also having

a surface adapted for engagement with the rams of a B.O.P. stack so that when the rams of the B.O.P. stack are actuated they engage the surface of the second member and rotation of the second member relative to the B.O.P. stack is prevented.

8. A method of orientating equipment in a well involving use of the rams of a B.O.P. stack which method comprises:

i. installing in a handling string an apparatus comprising an elongate member adapted to be connected in a handling string, the elongate member having a second member thereon which second member is moveable axially with respect to the elongate member and has means co-operating with corresponding means on the elongate member to prevent relative rotation, the second member also having a surface adapted for engagement with the rams of a B.O.P. stack so that when the rams of the B.O.P. stack are actuated they engage the surface of the second member and rotation of the second member relative to the B.O.P. stack is prevented.



ii. lowering the handling string until the equipment is a small distance above a landing point and the second member is adjacent a pair of rams of the B.O.P. stack

iii. closing the rams so that they engage the surface on the second member and prevent rotation thereof, and

iv. lowering the handling string to land the equipment.

4,022,282

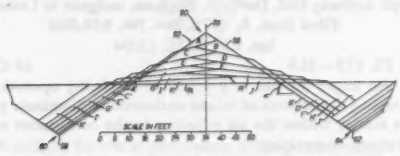
METHOD FOR RECLAIMING STRIP-MINED LAND

Harvey W. Rockwell, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Division of Ser. No. 544,334, Jan. 27, 1975, Pat. No. 3,994,349. This application July 21, 1976, Ser. No. 707,316

Int. Cl.² A01B *79/00*

U.S. Cl. 172—1 **3 Claims**



1. The method for laterally shifting material from an elongated spoil bank down the slopes thereof into elongated valleys on opposite sides of the spoil bank by means of apparatus comprising an adjustable side casting blade and means for moving said blade comprising the steps of: moving said apparatus in one direction along one side of the top of said spoil bank with said blade adjusted at a predetermined blade angle, at a predetermined depth of cut and at a predetermined tilt angle, whereby said material is shifted laterally down one slope of said spoil bank into one of said valleys; readjusting said blade to change the blade angle, the depth of cut and the blade tilt angle; and moving said apparatus in a direction opposite to said one direction along the opposite side of the top of said spoil bank, whereby said material is shifted laterally down the other slope of said spoil bank into the other of said valleys.

4,022,283

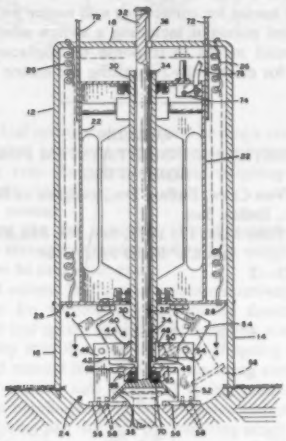
TOOL FOR REMOVING PLANT GROWTH FROM PERIPHERAL ZONES OF SPRINKLER HEADS

Marvel B. Morgan, 3027 E. Sample Ave., Fresno, Calif. 93710

Filed Jan. 23, 1976, Ser. No. 651,696

Int. Cl.² A01D *35/264*

U.S. Cl. 172—15 **8 Claims**



2. A power tool for removing plant growth and debris from a zone of an oblated hemispheric configuration concentrically related to an upstanding sprinkler head for a subterranean irrigation system comprising:

A. a portable frame adapted to be positioned above a selected sprinkler head and characterized by a pair of legs disposed in spaced parallelism terminating in an end portion adapted to be inserted into the ground for imparting stability to the frame;

B. an electrically energizable motor disposed between said legs having a rotary output shaft characterized by an axis of rotation coincident with the longitudinal axis of symmetry for said frame;

C. suspension means supporting said motor for rectilinear displacement along a path of displacement coincident with said axis of symmetry including a plurality of spring members connecting the motor with said frame in a supported relationship therewith, and guide members connecting said motor with said frame for restraining the motor against rotation and for guiding said motor along said path of displacement; and

D. a cutting head connected to the distal end of said rotary output shaft including a yoke connected to said shaft in concentric relation therewith comprising,

1. a spider having a plurality of radially extended arms,

2. a plurality of blade supporting legs pivotally connected to the distal ends of said arms and supported thereby for pivotal displacement in planes intersecting the axis of rotation for said drive shaft, along the length thereof,

3. a plurality of elongated blades rigidly fixed to said legs in angular relationship therewith, each blade of said

blades being provided with a pair of opposite end portions projected in a substantially common direction from the longitudinal axis of the blade and a cutting edge extended between the ends and along one side edge thereof,

4. a counterbalancing mass mounted on each of said legs at the ends thereof opposite said blades for biasing said legs in pivotal displacement,

5. a pilot shaft extended axially through said drive shaft and supported thereby for axial reciprocation,

6. a socket affixed to said pilot shaft in coaxial alignment with the drive shaft adapted to receive an upstanding sprinkler head,

7. means for connecting said socket with said yoke including a thrust bearing assembly concentrically related to said pilot shaft in interposed relation with said spider and said socket, and

8. a foot projected from each of said legs adapted to be engaged by said thrust bearing assembly as the pilot shaft is displaced; and

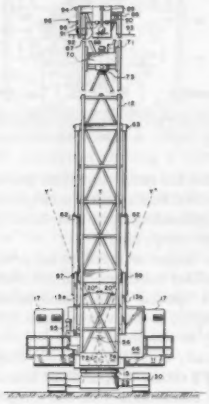
E. circuit means for connecting said motor with a source of electrical potential including a switch adapted to close the circuit means in response to displacement of said motor for electrically energizing the motor.

4,022,284

AUTOMATIC ALIGNMENT SYSTEM FOR EARTH BORING RIG

Morgan LeVon Crow, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Mar. 17, 1975, Ser. No. 558,872
Int. Cl.² E21B *7/02, 7/04*
U.S. Cl. 173—2 **5 Claims**



1. An alignment system for a movable vertical structure having power movement systems thereon, said alignment system adapted to maintain said structure in a substantially exact vertical orientation with respect to the center of gravity of the earth, and comprising:

first lateral sensing means on the vertical structure, located in one plane of movement of said structure and arranged to sense the direction of movement of the structure vertical axis in a direction parallel to said one plane;

second lateral sensing means on the vertical structure, located in a second plane at substantially right angle orientation to said first plane of movement of the structure, said second sensing means arranged to sense the direction of movement of the structure vertical axis in a direction parallel to said second plane;

signal means operatively connected to said first and second sensing means and adapted to generate signals in response to activation of said sensing means, said signal means operatively connected to the power movement systems on the vertical structure; and

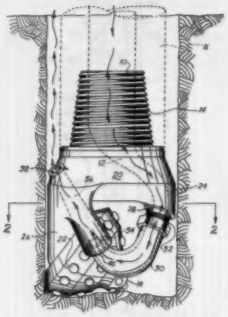
wherein at least one of said first and second sensing means comprises strain gauge means attached at one end to movable means mounted on the vertical structure, said strain gauge means adapted to generate electrical signals in response to movement of said movable means on the vertical structure.

4,022,285

DRILL BIT WITH SUCTION AND METHOD OF DRY DRILLING WITH LIQUID COLUMN

Donald D. Frank, 805 NE. 3rd, Andrews, Tex. 79714

Filed Mar. 11, 1976, Ser. No. 665,963
Int. Cl.² E21B *9/10*
U.S. Cl. 175—65 **5 Claims**



1. The improved method of drilling with a bit having a drilling fluid bore from the top connected to a source of drilling fluid under pressure and at least one cone journaled for rotation at the bottom comprising:

a. jetting all the drilling fluid upward from nozzles connected with said bore,

b. jetting all said drilling fluid from the nozzles through a discharge passage in the bit, said discharge passage

c. creating a low pressure in the passage, thereby

d. sucking up chips drilled by said cone through a space between the nozzle and passage and inside the passage, and

e. discharging the chips and fluid from the passage upward and outside the bit,

f. holding the column of fluid discharged by the discharge passage up by the jet of fluid from the passage, thereby

g. maintaining the area around the cone dry and free of drilling fluid.

4,022,286

AUGER

Joseph Anthony Gill, Darfield, England, assignor to Leeco, Inc.

Filed Sept. 5, 1975, Ser. No. 610,560
Int. Cl.² E21C *13/04*
U.S. Cl. 175—313 **16 Claims**

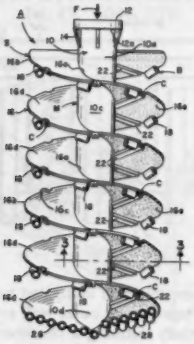
1. An auger for use in a continuous mining operation for preventing suspension of mined undesired contaminate particulate matter within the air adjacent to the continuous mining operation, comprising:

an elongate tubular member having a longitudinal bore formed therein and having a first end and a second end, said longitudinal bore of said tubular member adapted to be in communication with fluid pressure means adjacent said second end, said tubular member adapted to be rotated adjacent said second end;

a scroll having an inner peripheral edge and an outer peripheral edge for use in mining materials from the mine, said scroll radially spiralling along the longitudinal axis of

said tubular member from said first end to said second end with said inner peripheral edge being mounted with said tubular member such that rotation of said tubular member results in rotation of said scroll for mining materials from the mine while generating undesired contaminate particulate matter;

spray means terminating adjacent said outer peripheral edge of said scroll and in fluid communication with said



fluid pressure means for spraying fluid into the air adjacent said outer peripheral edge of said scroll preventing suspension of mined undesired contaminate particulate matter within the air adjacent to the continuous mining operation; and,

anti-clogging means being affixed with said spray means for continuously preventing clogging of said spray means during spraying of the fluid.

4,022,287

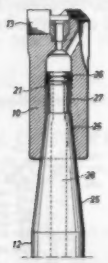
PERCUSSION DRILL BIT

Hans Per Olof Lundstrom, and Harry Arthur Wiredal, both of Sandviken, Sweden, assignors to Sandvik Aktiebolag, Sandviken, Sweden

Filed Apr. 20, 1976, Ser. No. 678,555

Int. Cl.² E21C *15/00*

U.S. Cl. 175—393 **7 Claims**



1. A drill bit for use in percussion drilling comprising a solid bit body having one or more cutting edges at its front end and a centrally disposed rod-receiving hole having in part a conical internal surface, said hole being bottomed in the drill bit and comprising a cylindrical internal surface in front of said conical surface, said cylindrical surface having an internal thread located at a middle portion of the cylindrical internal surface of said hole, the length of the internal thread in longitudinal section being about one half the length of the cylindrical internal surface disposed axially in front thereof.

4,022,288

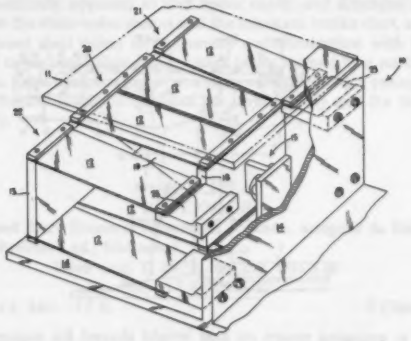
SERIES TWIN LEAF SPRING WEIGHING SCALE

Louis T. Canevari, Norwalk, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 27, 1976, Ser. No. 661,981

Int. Cl.² G01G *3/08*

U.S. Cl. 177—229 **12 Claims**



1. A twin leaf spring weighing scale having a combination of leaf springs that are arranged to provide a substantially constant spring rate throughout a scale weighing range, said weighing scale comprising:

a support means;

a weighing pan for receiving a load, said weighing pan moving through at least a portion of a weighing range in response to said load; and

a first and second leaf spring means operatively connected together for forming and effectively functioning as a unitized leaf spring means, said weighing pan being supported by said first and second leaf spring means, said first and second leaf spring means being carried by said support means, said first leaf spring means having an effective bending length that increases with movement of the weighing pan through the weighing range in response to a load, said second leaf spring means having an effective bending length that correspondingly decreases with movement of the weighing pan through the weighing range in response to said load, the increasing effective bending length of said first leaf spring means being effectively, substantially cancelled by the decreasing effective bending length of said second leaf spring means, whereby the combination of said first and said second leaf spring means provides a leaf spring arrangement having a substantially constant spring rate throughout the weighing range.

4,022,289

BALANCE

Martin Sauter, Ebingen, Germany, assignor to Gottl. Kern & Sohn, Ebingen, Germany

Filed Nov. 6, 1975, Ser. No. 629,298

Claims priority, application Germany, July 14, 1975, 2531417

Int. Cl.² G01G *1/32*, *21/26*

U.S. Cl. 177—247 **9 Claims**

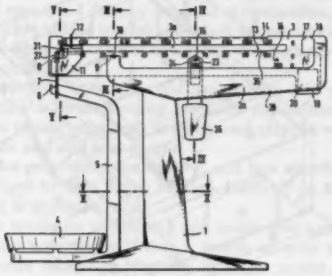
1. A balance comprising:

a. a base;

b. a main bearing on said base defining an axis;

c. an elongated beam supported on said main bearing for pivoting movement about said axis and having two arms of different length longitudinally extending from said axis in opposite directions, respective longitudinal edge portions of said arms being formed with a plurality of uniformly spaced notches;

d. a rider weight of approximately U-shaped cross section longitudinally movable on said beam,
1. said weight having two leg portions and a bight portion connecting said leg portions,
2. said portions of the weight defining a space receiving said main bearing during longitudinal movement of said weight from one of said arms to the other arm;



e. engaging means on said weight shaped for engagement with each of said notches for securing said weight in respective positions on either arm of said beam,
1. the center of gravity of said weight being located below said axis when said edge portion are elongated horizontally and said main bearing is received in said space; and

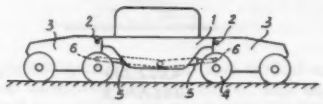
f. a single weighing pan mounted on the shorter arm of said beam.

4,022,290

OFF-ROAD VEHICLE

Jean-Jacques Boyer, Montchauvet, France, assignor to Societe Anonyme Secmafer, Buchelay, Mantes, France

Filed June 5, 1975, Ser. No. 583,907
Claims priority, application France, Aug. 8, 1974, 74.27636
Int. Cl.² B62D *61/10*
U.S. Cl. 180—14 R **8 Claims**



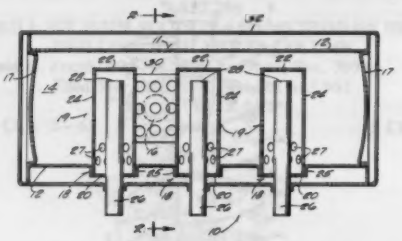
1. An off-road vehicle comprising a central chassis at each end of which is articulated, about a transverse axis, a bogie chassis with a jack acting between the central chassis and each bogie chassis to permit regulation of their relative longitudinal inclinations, each bogie chassis having supports thereon mounted for rotation about horizontal axes disposed at the front and rear of it for supporting the bogie chassis on the ground, the transverse axis of articulation of each bogie chassis on the central chassis being located at the end of the bogie chassis adjacent to the central chassis and being located above the plane of said axes, said jacks acting between the central chassis and a point on the bogie chassis which is located below the transverse axis of articulation of the associated said bogie chassis.

4,022,291

EXHAUST MUFFLER HAVING AN ATTENUATER CAN ASSEMBLY

Donald K. Stephenson, Sussex, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 21, 1975, Ser. No. 634,073
Int. Cl.² F01N *1/08*
U.S. Cl. 181—53 **5 Claims**



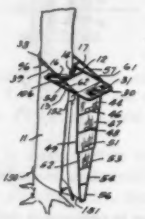
1. A muffler comprising an elongated tubular housing having an elongated axis and an outer wall extending parallel to said axis and partially defining a chamber, an inlet pipe extending radially with respect to said axis and through said outer wall for communication with said chamber and a plurality of attenuater can assemblies extending in parallel relation to each other and each including an attenuater can having a first end wall secured to and coincident with said outer wall, a second end wall and a cylindrical sidewall extending between said end walls and located within said chamber and extending generally perpendicularly to said outer wall of said tubular housing, said cylindrical sidewall having perforations within said chamber adjacent said first end wall, each said assembly also including an outlet pipe having an inlet located within said attenuater can adjacent said second end wall, said outlet pipe extending radially with respect to said axis and through said first end wall and through and beyond said outer wall for communication with the environment outside said tubular housing.

4,022,292

PORTABLE TREE STAND OR CROWS NEST

James J. Van Gompel, P.O. Box 397, Rte. No. 4, Fremont, Ind. 46737

Filed Aug. 12, 1976, Ser. No. 713,792
Int. Cl.² A47C *9/10*
U.S. Cl. 182—33 **17 Claims**



1. A portable tree stand comprising a frame with a platform on one end thereof, a pair of rollers mounted on axes which make an obtuse angle with each other at the other end of said frame member, an opening formed in said frame member between said platform and said other end, a foldable ladder sections attached to said frame member such that in a first position said ladder can be climbed, said foldable ladder moveable to a second position such that the foldable sections

thereof can be formed into a chair, and attaching means attached to said frame member for detachably extending around a tree or other vertical support to lock said frame member to said tree.

4,022,293

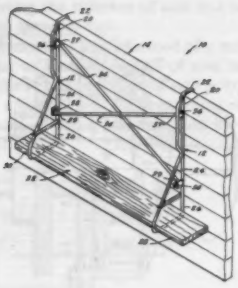
FOLD-AWAY HOOK PLATFORM

Elmer L. Hallagin, Box 89, McDonald, Kans. 67745

Filed Feb. 23, 1976, Ser. No. 660,708

Int. Cl.² E04G 3/10

U.S. Cl. 182—150 **6 Claims**



1. A fold-away hook platform used as a scaffold, the platform comprising:

a pair of vertical scaffold arms positioned adjacent to each other in a spaced relationship, said arms having an upper portion, a center portion, and a lower portion, the upper portion of said arms having a hook portion extending rearwardly therefrom for attaching the platform to a structure;

a board for standing on, the end portions of said board resting on the lower portion of said arms and supported thereby; and

a pair of scaffold braces, the one end of said braces pivotally attached to said arms, the opposite of said braces removably attached to said adjacent scaffold arm, said braces cross in an X configuration when attached to said scaffold arms.

4,022,294

DEVICE FOR LUBRICATING THE GUIDING SYSTEM OF AN INTERNAL COMBUSTION ENGINE VALVE

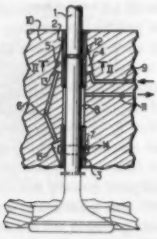
Jean-Paul René Coulin, Enghien-les-Bains, France, assignor to Societe d'Etudes de Machines Thermiques, Saint Denis, France

Filed Nov. 21, 1975, Ser. No. 634,158

Claims priority, application France, Feb. 27, 1975, 75.06162

Int. Cl.² F01M 9/10

U.S. Cl. 184—6.9 **3 Claims**



1. A device for lubricating the guiding system of an internal combustion engine valve, in which at least one valve stem is mounted in a guide means; an upper cavity in selective interconnection with the valve stem; a lower annular cavity communicating permanently with the upper cavity through a duct; a lubricant intake duct; and means forming a slide-valve on the valve stem for selectively interconnecting the lubricant intake duct and the lower cavity; a third cavity located at one and the same level around the valve stem and substantially diametrically opposite to said upper cavity and arranged between the slide-valve means and the lubricant intake duct, said lubricant duct being in permanent communication with the third cavity, said slide-valve means being formed by a portion of the valve stem having an annular groove forming a passageway for the lubricant between the upper cavity and the third cavity.

4,022,295

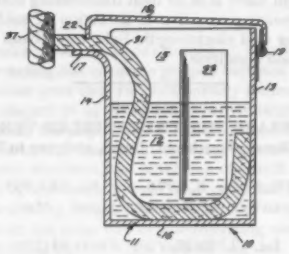
ROPE OILER

Konrad Karl Breuers, Richmond, Canada, assignor to Delco Industries Ltd., Richmond, Canada

Filed Aug. 1, 1975, Ser. No. 601,138

Int. Cl.² F16N 7/12

U.S. Cl. 184—15 R **3 Claims**



1. A lubricator for wire ropes comprising:

a. a container adapted to hole a quantity of liquid lubricant, the container having front and back walls,

b. the front wall having an outwardly extending horizontal portion so as to provide a flat horizontal platform,

c. a wick extending over the platform and into the container into the lubricant therein,

d. a cover-plate hingedly connected to the back wall of the container and having a downwardly extending lip along a front edge thereof adapted to engage the wick along a line substantially centrally of the platform, and

e. means connecting the cover-plate and container normally holding the cover-plate with its lip against the wick so as to prevent movement of the wick into or out of the container.

4,022,296

SIGNAL INPUT DEVICES AND SYSTEMS

Alan F. Mandel, Pittsburgh, Pa., and Jerry D. Bass, Martinez, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 16, 1975, Ser. No. 578,301

Int. Cl.² B66B 3/00

U.S. Cl. 187—29 R **28 Claims**

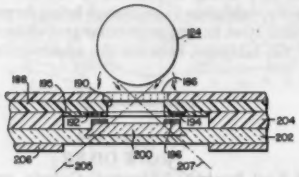
1. A signal input device, comprising:

a switch including a printed circuit board having first and second major opposed sides and an opening which extends between its first and second sides, first and second electrically conductive elements disposed on the first side of said printed circuit board adjacent the opening, and a third electrically conductive element spaced from the first side of said printed circuit board and from said first and second electrically conductive elements, with said third electrically conductive element having a light trans-

missive portion in substantial alignment with the opening in said printed circuit board,

a light source adapted for continuous energization,

an electro-optic light valve operable between first and second conditions, with one of the conditions being a light transmitting condition and the other a light blocking condition, said electro-optic light valve being disposed between the light source and the second side of said



printed circuit board such that light from said light source is transmitted through the opening in the printed circuit board and through the light transmissive portion of said third electrically conductive element when the electro-optic light valve is in its light transmitting condition, and

detector means responsive to actuation of said switch for operating said electro-optic light valve from the first to the second condition.

4,022,297

DISC BRAKE FOR TWO-WHEELED VEHICLE

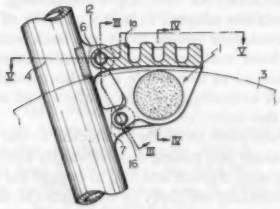
Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Japan

Filed Mar. 8, 1976, Ser. No. 664,895

Claims priority, application Japan, Mar. 20, 1975, 50-33969

Int. Cl.² B62L *1/00;* **F16D** *55/224*

U.S. Cl. 188—26 **5 Claims**



1. In a disc brake for use in a two-wheeled vehicle and of the type comprising a calliper straddling a rotatable disc and having an actuator disposed at one side of the disc, the improvement wherein said calliper is slidably mounted on a stationary part of the vehicle by means of a guide pin disposed outside of the outer periphery of the disc and extending across the disc in a direction normal to the surface of the disc, and further comprising means for preventing rotation of the calliper around the guide pin, said means being disposed at a position inside of the outer periphery of the disc and at said one side of the disc.

4,022,298

WET DISC BRAKE

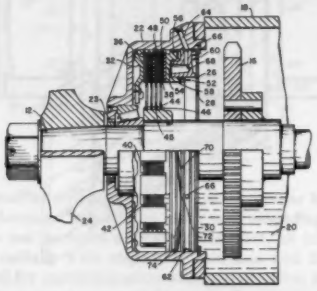
Eugene F. Malinowski, Milford, Mich., assignor to D.A.B. Industries, Inc., Detroit, Mich.

Filed Mar. 29, 1976, Ser. No. 671,087

Int. Cl.² F16D *65/84*

U.S. Cl. 188—71.6 **3 Claims**

1. A wet disc brake for a rotating member such as an axle comprising a sealed housing including means for sealingly journalling same on said rotating member, at least one first brake disc including means for non-rotatably but axially slidably mounting same on said rotating member, at lease one second brake disc non-rotatably but axially slidably mounted within said housing adjacent said first brake disc, one of said brake discs having friction material adhered thereto in contactable relationship to the other brake disc, a piston axially slidably mounted within said housing, fluid pressure means associated with said housing for shifting the piston axially into pressure engagement with one of the brake discs to cause braking engagement of the discs, a pool of oil in said housing, at least a portion of said first brake disc in contacting relationship with said pool to thereby wet said first brake disc with oil upon rotation thereof, spring means associated with said hous-



ing constantly biasing said piston into low pressure engagement with said one brake disc to cause said one brake disc to be in low pressure engagement with said other brake disc, and a second sealed housing containing a pool of oil sealingly secured to the aforementioned sealed housing, said second sealed housing being secured to the aforementioned sealed housing in a manner for oil to flow into the aforementioned sealed housing from said second housing, and annular baffle means between said two housings to prevent flow of all of the oil contained in said aforementioned sealed housing back into said second sealed housing and from said second sealed housing back into said aforementioned sealed housing.

4,022,299

ADJUSTING DEVICE FOR A MECHANICALLY OPERATED DISC BRAKE

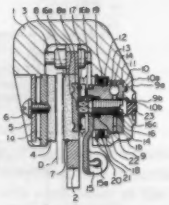
Tetsuo Haraikawa, Funabashi, Japan, assignor to Tokico Ltd., Kanagawa, Japan

Filed Feb. 12, 1976, Ser. No. 657,623

Claims priority, application Japan, Feb. 17, 1975, 50-19627; Feb. 18, 1975, 50-19997

Int. Cl.² F16D *65/56, 55/224*

U.S. Cl. 188—71.9 **5 Claims**



1. A mechanical type disc brake comprising:

a calliper slidably supported in the axial direction of a disc and straddling a peripheral portion of said disc;

a stationary pad secured to said calliper for engaging with one surface of said disc;

a movable pad disposed opposite to said stationary pad and being mounted for sliding movement in the axial direction only for engaging a second surface of said disc;

a nut member mounted in said calliper and adapted to be rotated by means of a brake arm;

an adjusting bolt threadingly extending through said nut member, a first end of said adjusting bolt having a polygonal cross-section and abutting said movable pad for urging said movable pad against said second surface of said disc, said adjusting bolt being rotatable relative to said movable pad;

means for converting the rotation of said nut member into axial movement thereof; and

a rotation control member being formed of a resilient material and secured to a backing plate of said movable pad for engaging with at least one side of said polygonal cross-section of said adjusting bolt for controlling relative rotation between said adjusting bolt and said movable pad.

4,022,300

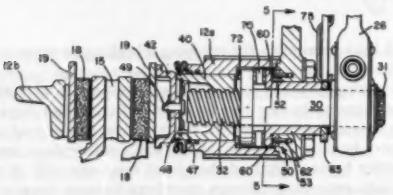
MECHANICAL DISC BRAKE

Carlos P. Afanador, Centerville, and Chester N. Fannin, Troy, both of Ohio, assignors to Dayton-Walther Corporation, Dayton, Ohio

Filed Aug. 19, 1976, Ser. No. 715,932

Int. Cl.² F16D *55/08*

U.S. Cl. 188—72.1 **7 Claims**



1. A two-stage mechanical actuator for a disc brake for rapidly taking up brake running clearance and thereafter applying high mechanical advantage in the application of the brake, comprising a caliper housing, an internally threaded piston slidably received in said housing and having a forward end portion thereof adapted to apply braking force to an adjacent pad of friction material, a threaded actuating shaft in said housing rotatably engaged with the threads of said piston and having a rearward portion extending externally of said housing so that rotation of said shaft results in axial movement of said piston, means mounting said shaft in said housing for limited axial movement, a secondary actuator coacting with said shaft for causing said axial movement thereof including a rotatable member positioned coaxially of said shaft and a fixed member, cooperating cam means between said members providing for limited axial movement of said rotatable member upon rotation thereof, thrust means coupling said rotatable member to said shaft for transmitting said limited axial movement to said shaft, and means for rotating said rotatable member concurrently with the initial rotation of said shaft when applying the brake to take up at least a substantial portion of said running clearance.

4,022,301

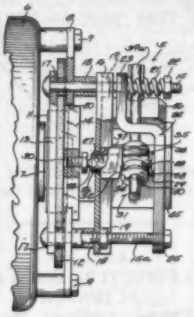
SPRING-APPLIED ELECTROMAGNETICALLY-RELEASED BRAKE

Quinten A. Hansen, Franksville, Wis., assignor to Scott Brake, Inc., Yorkville, Ill.

Filed Dec. 29, 1975, Ser. No. 645,204

Int. Cl.² F16D *55/30;* **B60T** *13/04*

U.S. Cl. 188—72.1 **13 Claims**



1. In a brake of the character described, wherein a chordal portion of rotating disc means is gripped between non-rotating inner and outer jaws that are substantially symmetrically disposed with respect to an axis passing perpendicularly through the disc means, the improvement which comprises:

A. rigid structure including overlying spaced apart inner and outer members, the inner one of which is fixed with respect to the inner one of said jaws, and both of said members being intersected by said axis;

B. means on the inner one of said overlying members floatingly holding the outer jaw in position;

C. a lever having a medial portion intersected by said axis and disposed outwardly of the outer one of said overlying members;

D. means hingedly connecting one end portion of the lever with said rigid structure and providing for swinging movement of said medial portion of the lever towards and from the jaws;

E. a post passing through a hole in the outer one of said overlying members and extending along said axis and axially interposed between the medial portion of said lever and the outer jaw to form a force transmitting connection between said lever and said outer jaw and through which said force acts to energize the brake;

F. cam means arranged to react between said post and the outer one of said overlying members of the rigid structure and upon activation thereof to impart brake releasing motion to said post; and

G. means for activating said cam means.

4,022,302

DISC BRAKE PADS

Theodor Janssen, Duisburg, Germany, assignor to Abex Pagid Reibbelag GmbH, Essen, Germany

Filed May 29, 1975, Ser. No. 582,006

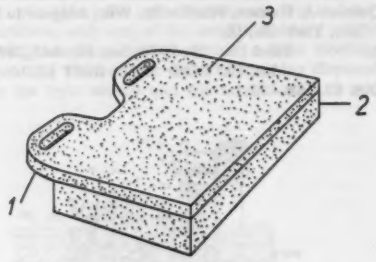
Claims priority, application Germany, June 5, 1974, 2427040

Int. Cl.² F16D *65/04*

U.S. Cl. 188—73.1 **4 Claims**

1. A disc brake pad comprising a support plate having friction material mounted on one face thereof, characterized

in that a coating of latex to a thickness of less than .1mm is bonded by vulcanization to the other face of the support plate



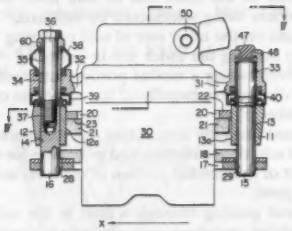
for direct engagement by an operating piston to increase friction between the support plate and the piston.

4,022,303

MOUNTING STRUCTURE FOR A DISC BRAKE ACTUATOR

Toshio Kondo, Chiryu; Yoshinori Mori, and Masakazu Ishikawa, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Mar. 3, 1976, Ser. No. 663,232
Claims priority, application Japan, Mar. 4, 1975, 50-26141
Int. Cl.² F16D *65/20*
U.S. Cl. 188—73.3 **5 Claims**



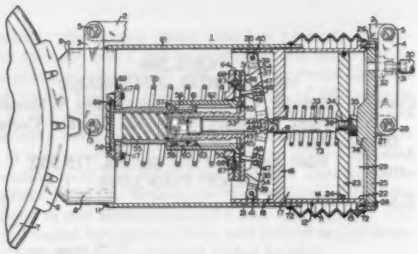
1. A disc brake comprising;
- a friction disc secured to a rotational portion of a vehicle wheel assembly to rotate therewith,
- a stationary member secured to a fixed portion of the vehicle wheel assembly and having a pair of radially extending arms defining a space therebetween, each said arm being provided with through bores, said through bores being parallel with an axis of rotation of said disc,
- a pair of parallel pin members respectively inserted into said bores securely to provide a rigid connection of the pin members with the stationary member such that the pin members protrude from the same side of the arms,
- a sleeve secured to one of said arms on the side opposite to that from which said pin member protrudes, said sleeve being tightened to the arm by means of a bolt having a head and passing through the sleeve with clearance and with said head clamping the sleeve to said arm so that the sleeve is loaded under compression,
- a guiding member secured to the other of said arms of the stationary member on the same side thereof as the sleeve,
- a movable caliper member having a pair of laterally extending arms, said movable caliper member being provided with a through bore in one of said arms to slidably receive said sleeve and a blind bore in the other of said arms to slidably receive said guiding member so that the movable caliper member can slide on said sleeve and on said guiding member along the axis of rotation of the disc,
- fluidically operated brake actuating means disposed within said movable caliper member,
- a first pad having both sides thereof slidably arranged on said arms of said stationary member for shifting along the rotational axis of said disc and engageable with one face of said disc by said brake actuating means in braking operation,
- a second pad having both sides thereof slidably arranged on said pair of pin members to be brought into contact with the opposite face of said disc as the result of the sliding movement of said movable caliper member due to a reaction force set up by engagement of said first pad with the disc,
- rubber boots being provided between both sides of said one of said arms of the movable caliper member and the sleeve to exclude dirt, and
- a second rubber boot provided between the other of said arms of the movable caliper member and said guiding member.

4,022,304

TREAD BRAKE ASSEMBLY

Willard P. Spalding, Penn Hills, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Aug. 2, 1976, Ser. No. 710,464
Int. Cl.² F16D *65/56*
U.S. Cl. 188—203 **31 Claims**



1. A brake assembly for applying a braking force to a vehicle wheel, said assembly comprising:
- a. a casing pivotally suspended with respect to the vehicle, said casing having therein a pair of chambers separated by a wall having therein a central bore, one of said chambers having a smooth cylindrical wall surface and the other having disposed therein at least one pair of oppositely extending fulcrum members formed integral with said casing,
- b. a piston slidably mounted in said one chamber and having a piston rod extending from one face thereof through said central bore in said wall into said other chamber, said piston being movable in opposite directions responsively to the supply of fluid under pressure to the other face thereof and the release of fluid under pressure therefrom,
- c. a pair of levers disposed in said other chamber, each of said levers being pivotally mounted at one end on one of said fulcrum members and operatively connected at the other end to said piston rod,
- d. a brake-shoe-carrying brake head pivotally suspended with respect to the vehicle,
- e. a hollow brake rod member rotatably mounted at one end with respect to said brake head and axially movable sustantially in a straight line, said hollow brake rod member being provided with a non-self-locking screw thread,
- f. a cylindrical member provided with a non-self-locking screw thread having screw-threaded engagement with the non-self-locking screw thread of said brake rod member, said cylindrical member being provided at one end thereof with a flange that is integral therewith,
- g. means for rendering said hollow brake rod member non-

rotatable with respect to said cylindrical member in response to the supply of fluid under pressure to said other face of said piston and effective to cause the transmittal of a braking force from said pair of levers to said brake-shoe-carrying brake head while said hollow rod member is rendered non-rotatable with respect to said cylindrical member, and

h. biasing means interposed between said flange and said brake-shoe-carrying brake head for constantly transmitting a limited force to said brake head and operative upon the release of said braking force only subsequent to the occurrence of brake shoe wear while said braking force was transmitted to said brake head, to cause rotation of said hollow brake rod member relative to said cylindrical member to increase the effective length of said hollow brake rod member to compensate for said brake shoe wear.

4,022,305

PARKING ACTUATOR FOR A DUO-SERVO DRUM BRAKE

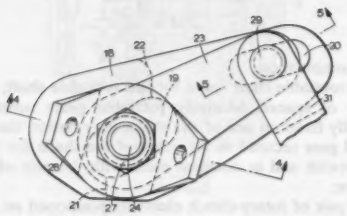
Terence George Southam, Walsall, England, assignor to Girling Limited, Birmingham, England

Filed July 15, 1975, Ser. No. 596,160

Claims priority, application United Kingdom, July 19, 1974, 32029/74

Int. Cl.² F16D *51/22*

U.S. Cl. 188—332 **5 Claims**



1. A vehicle internal shoe-drum brake of the duo-servo type comprising opposed arcuate shoes for engagement with a rotatable drum and having adjacent actuated ends and adjacent non-actuated ends, an angularly movable cam located between said actuated ends of said shoes and movable angularly to separate said actuated ends to apply the brake, means coupling together said non-actuated ends so that when the brake is applied one of said shoes acting as a leading shoe and known as a primary shoe is carried round with the drum to transmit a circumferentially directed force to the other of said shoes known as a secondary shoe, an anchor pin located between said actuated shoe ends and defining a first abutment engaged by said actuated end of said secondary shoe to take the drag on said shoes, a cam lever separate from said cam, a non-rotatable pivot fixed against substantial lateral movement with respect to said anchor pin and about which said cam lever is angularly moveable, transmission means for moving said cam lever angularly about said pivot, a single pivot pin separate from said pivot and fixed against lateral movement relative to said cam lever, said pivot pin directly connecting together said cam, said cam lever and said transmission means and being the sole connection between these members, means cooperating with said pivot pin and said transmission means to prevent axial separation from each other and said pin of said cam, said cam lever and said transmission means, said pivot for said cam lever also coupling said cam lever and said cam, and guide means incorporated in said cam constructed and arranged to permit said cam to have a circumferential movement both with said actuated shoe ends and relative to said cam lever in the application of the brake, said guide means comprising a pair of spaced elongated slots in said cam through which said pivot and said pivot pin extend, respectively.

4,022,306

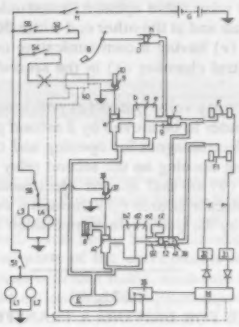
ANTI-SKID BRAKE SYSTEM WITH ACCELERATOR CONTROL

Yasuo Sato, 11 Kizukuri-cho, Gifu, Japan

Filed Oct. 28, 1975, Ser. No. 625,942

Int. Cl.² B60K *29/02*; B60T *7/12*

U.S. Cl. 192—3 TR **3 Claims**



1. A brake mechanism with a first and second unit, said first unit comprising:

a. a first cylinder body having a first large chamber and a first small chamber;

b. a first power position (*d*2) movably positioned in said first large chamber of the first cylinder body for dividing the first large chamber into a first control chamber (*b*2) and a first vacuum chamber (*e*2);

c. said first vacuum chamber (*e*2) in the first large chamber communicating with an intake manifold (E);

d. a first hydraulic piston (*f*2) and a control valve (39) having a communicating orifice positioned in said first small chamber of the first cylinder body to be moved by said power piston (*d*2) to divide the first small chamber into a first high pressure chamber (41), a buffer chamber and a second control chamber (*g*2);

e. said high pressure chamber (41) in the small chamber communicating with a brake cylinder (F_1) of a driving wheel;

f. said buffer chamber in the first small chamber having a communicating opening for selectively communicating the buffer chamber with a brake cylinder (F) of an undriven wheel in accordance with the operation of said control valve (39);

g. a first relay valve cylinder communicating at the one end with air and at the other end with said first vacuum chamber (*e*2) having a communicating opening with said first control chamber (*b*2) in the first large chamber;

h. a first relay valve piston (*a*2) positioned in said first relay valve cylinder to be moved by a first plunger (38) of a first electromagnet for opening and closing said communicating opening on the first relay valve cylinder;

i. detecting means connected with a solenoid (37) of said first electromagnet through a servoamplifier (M) for detecting the lock phenomenon of the driving wheel; said second unit comprising power magnifying connecting means for connecting said brake cylinder (F) of the undriven wheel to a master cylinder (D), including:

j. a second cylinder body having a second large chamber and a second small chamber;

k. a second power piston (*d*) movably positoned in said second large chamber of the second cylinder body to divide the second large chamber into a third control chamber (*b*) and a second vacuum chamber (*e*);

l. said second vacuum chamber (*e*) in the large chamber communicating with the intake manifold (E):

m. a second hydraulic piston (*f*) positioned in said second small chamber of the second cylinder body to be moved by said second power piston (*d*) to divide the second small chamber into a second high pressure chamber and a fourth control chamber (*g*)

n. said second high pressure chamber in the second small chamber communicating with the brake cylinder (F) of the undriven wheel;

o. said fourth control chamber (*g*) in the second small chamber communicating with the master cylinder (D);

p. a second relay valve cylinder communicated at the one end with air and at the other end with said second vacuum chamber (*e*) having a communicating opening with said third control chamber (*b*) in the second large chamber; and

q. a second relay valve piston (*a*) positioned in said second relay cylinder to be moved by a second plunger (10) of a second electromagnet for opening and closing said communicating opening on the second relay valve cylinder, a solenoid (9) of said second electromagnet connecting with an electric source (G) through a switch (S2) which is closed by the quick release operation of an accelerator pedal.

4,022,307

DEVICE FOR DRIVING A TRANSFER BEAM

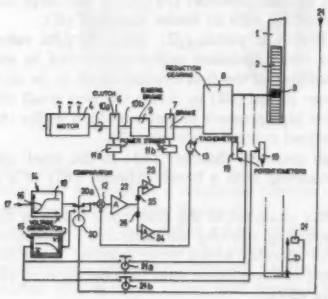
Yves Berrié; Claude Sebire, and Francois Dollé, all of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Hauts de Seine and Automobiles Peugeot, Paris, both of, France

Filed Nov. 14, 1975, Ser. No. 631,942

Claims priority, application France, Nov. 14, 1974, 74.37574

Int. Cl.[2] F16D *67/06*

U.S. Cl. 192—12 D **4 Claims**



1. Device for driving a transfer beam, notably for handling relatively heavy loads, in which the reciprocating transfer beam is rigid with a rack meshing with a pinion driven by a motor in either direction for imparting to and fro movements to said beam, said device further comprising in the transmission from said motor to said pinion a clutch and a brake both controlled by electro-magnetic means, servo means for supplying electric current to each electro-magnetic control of said clutch and brake, said system comprising a comparator having one input supplied with current from a tachometric generator coupled to the transmission member operatively connected to said pinion for supplying real velocity data, and another input for the reference velocity data, the output of said comparator being coupled via amplifiers responsive to the polarity of the output signal on the one hand to a stage supplying electric power to the electro-magnetic clutch control means and on the other hand to another stage supplying electric power to the electro-magnetic brake control means, and a pair of servo generators, one servo generator adapted to monitor the acceleration phase of the transfer beam from the standstill condition thereof and the other the deceleration phase of said transfer beam before stopping said beam, said pair of servo generators being coupled to the reference velocity data input via switching means putting one or the other servo generator into service in response to predetermined positions of said transfer beam and means responsive to the positions of said beam being provided to monitor said other servo generator.

4,022,308

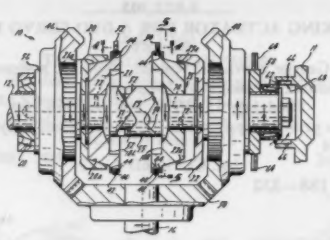
DRIVE COUPLING AND CLUTCHES

John W. Hurst, Port Huron, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Apr. 23, 1976, Ser. No. 679,528

Int. Cl.[2] F16D *21/00, 13/26, 43/20*

U.S. Cl. 192—21 **8 Claims**



1. In combination:

a first rotatable shaft and a second rotatable shaft;

a pair of spaced relatively rotatable gears substantially axially fixed on one of the shafts for rotation thereon;

a third gear secured to the other of the shafts for rotation therewith and in constant mesh with the pair of spaced gears;

a first pair of rotary clutch elements positioned on the one shaft between the pair of spaced gears, one of each of the clutch elements being secured to one of each of the spaced gears and rotatable therewith.

a second pair of rotary clutch elements positioned on the one shaft between the first pair of clutch elements whereby each of the second pair of elements is adjacent one of the corresponding elements of the first pair and adapted for clutching engagement therewith, each of the clutch elements of the second pair being partially rotatable and axially reciprocable on the shaft;

shift control means interconnecting the clutch elements of the second pair for coordinating and controlling their reciprocating movement and axial position on the shaft whereby one or the other of the clutch elements of the second pair may be moved along the shaft into engagement with its correspondingly adjacent clutch element of the first pair and both of the clutch elements of the second pair may be simultaneously moved on the shaft to a position which is spaced from the clutch elements of the first pair;

a drive member positioned between the clutch elements of the second pair and secured to the one shaft for rotation therewith, the member having opposite ends positioned adjacent each of the clutch elements, respectively;

first means comprising two sets of helical camming surfaces, each set being radially distributed about the one shaft and rotatable and reciprocable with one of the clutch elements of the second pair and extending therefrom toward one of the ends of the drive member, and

second means comprising another two sets of helical camming surfaces, each set being radially distributed about one of the ends of the drive member and about the shaft and rotatable with the drive member about the shaft, each set extending toward and overlapping with one of the sets

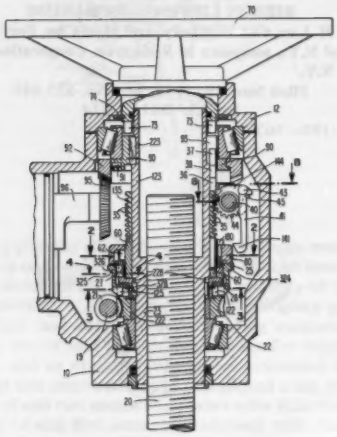
of the other helical surfaces and complementary therewith, whereby reciprocation of one of the clutch elements of the second pair to cause engagement with the adjacent clutch element of the first pair during rotation with the reciprocated clutch member, or the drive member on the shaft, causes engagement between the corresponding helical surfaces thereof and rotational movement is transferred between the shafts and the clutch members.

4,022,309

DE-CLUTCH MECHANISM FOR VALVE OPERATOR

Walter J. Denkowski, and John Zouzoulas, both of King of Prussia, Pa., assignors to Philadelphia Gear Corporation, King of Prussia, Pa.

Filed Mar. 26, 1975, Ser. No. 562,231
Int. Cl.² F16H *33/00*; F16D *21/02*
U.S. Cl. 192—48.5 5 Claims



1. A drive control mechanism for a valve stem nut or other rotational load member, said mechanism comprising:

a. a primary rotational power drive;

b. clutch means normally connecting said power drive to said load member through low-friction rolling elements;

c. a secondary rotational handwheel drive;

d. de-clutch means normally disconnecting said handwheel drive from said load member, said de-clutch means adapted to be shifted manually in the axial direction of said load member from normal to shifted position, said de-clutch means in shifted position adapted to connect said handwheel drive to said load member;

e. said de-clutch means including

e-1 common means operately associated with said clutch means for utilizing said low-friction rolling elements to disconnect said power drive;

e-2 means for automatically disconnecting said handwheel drive and connecting said power drive in response to actuation of said power drive;

e-3 latch means for latching said declutch means in shifted position;

f. said clutch means including

f-1 an outer annular member;

f-2 an inner annular member;

f-3 an intermediate annular member positioned between said outer and inner members, all of said annular members being concentric;

f-4 said intermediate member being provided with slots extending radially through said intermediate member;

f-5 detent rollers in said slots;

f-6 said rollers having diameters which exceed the radial thickness of said intermediate member;

f-7 recesses in said outer and inner annular members for receiving portions of said detent rollers which project beyond said intermediate member; and

f-8 bias means for normally maintaining said recesses in said inner member out of radial alignment with said slots.

4,022,310

FRICTION DISC WITH BONDED LINING

Gérard de Gennes, Senlis, France, assignor to Societe Anonyme Francaise du Ferodo, Paris, France

Filed Dec. 9, 1975, Ser. No. 639,123
Int. Cl.² F16D *13/60*
U.S. Cl. 192—107 C 4 Claims

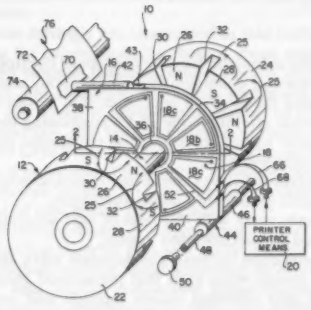
1. A friction disc of the progressive engagement type, comprising two substantially flat annular friction linings extending respectively on both sides and in contact with a cut-out and corrugated support, each lining being individually fixed on said support along parts of the corrugations of the support which are in contact with said lining, each said friction lining being fixed on said cut-out and corrugated support by glueing zones.

4,022,311

ELECTRODYNAMIC ACTUATOR

Felix B. Krull, Leitershofen near Augsburg, Germany, assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 19, 1975, Ser. No. 633,316
Int. Cl.² B41J *3/04*
U.S. Cl. 197—1 R 2 Claims



1. An actuator comprising:

first and second magnet means being of the multi-pole, permanent-magnet type and being spaced apart in parallel relationship to each other;

a non-ferrous axle interconnecting said first and second magnet means;

a plurality of output means mounted on said axle between said first and second magnet means for rotating movement between inoperative and operative positions thereon, with each said output means being disc-shaped and having a plurality of coils thereon;

said first and second magnet means having an equal number of poles and being aligned in an axial direction along said axle so that a north pole of the first magnet means is opposite a south pole of the second magnet means, and vice versa;

each said output means having an output member thereon

and a plurality of coils thereon, with one such coil being provided for each said pole of said first and second magnet means;

said plurality of coils being radially arranged on the associated said output means so that each said coil is displaced from the associated said poles by half a pole pitch when said output means is in said inoperative position, and each said coil has a plurality of turns with one half of the turns thereof being located on one side of the output means and the remaining half of the turns of said coil being located on the opposite side of the associated said output means, and with the plurality of coils for the associated said output means being series connected with one another; and

energizing means for selectively energizing said plurality of coils on said plurality of output means to move the associated said output means from said inoperative to said operative position and to return it to said inoperative position.

4,022,312

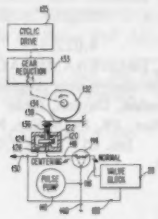
SEMI-AUTOMATIC CENTERING CONTROL

William Albertus Abell, Jr., Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,255

Int. Cl.² B41J *23/20*, *19/62*

U.S. Cl. 197—15 **2 Claims**



1. A semi-automatic bicyclic backspace control for use on a cyclic typewriter comprising in combination, selection means for selecting the mode of operation, said modes of operation being normal printing mode and a positioning mode;

a pressure source for providing pneumatic pulses to said selection means;

and plurality of valves connected to said selector means and supplied pressurized pulses therefrom;

a separate valve with the inlet of said separate valve connected to said selection means;

said connection between said separate valve and said selection means being such that pressurized pulses may flow from said selection means through said separate valve when said selection means is in said positioning mode;

an outlet pressure line emanating from said separate valve;

a cam;

follower means engaging said cam and acting to control said separate valve in response to a rise of said cam,

means driving said cam in response to the cyclical operation of said typewriter and at a rate to present a rise of said cam to said follower every alternate cycle of said typewriter, whereby pulses from said pump are only capable of being transmitted to a utilizing device in the positioning mode every other cycle of said typewriter operation.

2. A typewriter, comprising printing means, character key levers to control said printing means, escapement means, backspace operating means, control means for causing operation of said backspace operating means in response to character keylever depressions from the keyboard of said typewriter, and means for preventing said control means from operating said backspace means in response to normal character keylever depressions of said keyboard on alternate cycles of said typewriter;

means for preventing said printing and escapement means from printing and escaping in response to characeter keylever depressions, said means for preventing printing and escaping and said means for controlling said backspace mechanism being responsive to said control means connected operatively thereto, whereby said typewriter is backspaced on alternate cycles while being operated in a non-printing and non-escaping operation on the remaining cycles of said typwriter operation in response to keylever depressions, thereby causing said typewriter to reverse escape one half of the length of an entry allowing improved operation prior to printing an entry centered around a starting point.

4,022,313

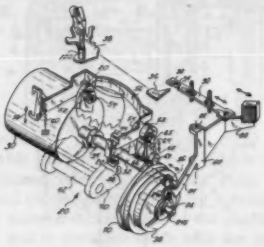
RIBBON LIFTING MECHANISM

Edward H. Lau, Old Westbury, and Mosi Chu, Port Jefferson, both of N.Y., assignors to Redactron Corporation, Hauppauge, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,441

Int. Cl.² B41J *35/14*

U.S. Cl. 197—167 **7 Claims**



1. In a printer wherein a ribbon is driven against a platen by a print element, ribbon lifting apparatus for controllably positioning different transverse regions of the ribbon between the platen and the print element at the time of impact, said apparatus comprising ribbon guide means for supporting a ribbon between the platen and the print element, pivotable support means for supporting said guide means to pivot through an arc such that different transverse regions of ribbon are available for impact against the platen, spring means for biasing said guide means to pivot in a given direction, a one revolution drive means, an *n*-to-one reduction gear driven by said drive means, an *n*-lobe cam driven by said reduction gear, a shaft, a cam roller rotatably supported by said shaft and resting on said cam, means for supporting said shaft to pivot about a point remote from said shaft, a link having one end connected to said shaft, connecting means for fixedly connecting the other end of said link to said guide means, said connecting means being adjustable so that the rest position of said guide means can be controllably located and disengaging means for disengaging said cam from said follower means whereby said guide means is moved by said spring means out of interposition between said print head and said platen.

4,022,314

SAWMILL APPARATUS

Cyrus J. Cornell, P.O. Box 18, Laceyville, Pa. 18623

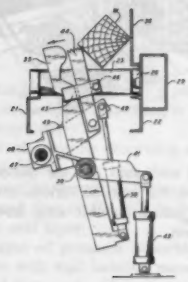
Division of Ser. No. 582,747, June 2, 1975. This application Dec. 1, 1975, Ser. No. 636,532

Int. Cl.² B65G *47/24*

U.S. Cl. 198—413 **6 Claims**

1. Apparatus for transporting an elongated piece of wood of generally rectangular cross-section and rotating said piece

about its lengthwise axis, comprising, in combination: a plurality of cylindrical rolls; support means for supporting said rolls spaced apart in a row extending in a first direction and for rotatably journalling the ends of said rolls with the upper edges of said rolls substantially located in a common plane; a first shaft journalled at a level below said rolls and extending in said first direction parallel to said common plane; a plurality of first arms each extending generally radially from said first shaft upwardly between a respective pair of said rolls; guide means having a substantially vertical surface extending in said first direction above said plane adjacent one end of each of



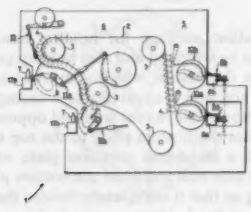
said rolls; a plurality of pusher arms each slidingly mounted on a respective one of said first arms; a second shaft extending in said first direction and journalled on a plurality of said first arms; a plurality of second arms each extending generally radially from said second shaft and being connected to a respective one of said pusher arms; means for rotating said first shaft; and an extensible ram means connected between one of said first arms and one of said second arms, where by extension of said ram means said pusher arms slide toward the outer ends of said first arms simultaneously with rotation of said first shaft to move said first arms away from said vertical surface.

4,022,315

BOTTLE HANDLING APPARATUS

Hiroshi Hori, and Kazunori Tuchimoto, both of Kanazawa, Japan, assignors to Shibuya Kogyo Company, Ltd., Kanazawa, Japan

Filed July 25, 1975, Ser. No. 599,157
Claims priority, application Japan, Aug. 5, 1974, 49-89615
Int. Cl.² B65G *47/00*
U.S. Cl. 198—471 **13 Claims**



1. In a bottle handling apparatus, the combination comprising:

bottle conveyor means for continuously conveying bottles which are mounted thereon in groups, each group containing a selected number of bottles disposed in a line, said bottle conveying means having a plurality of bottle holding means arranged in series therealong, each said bottle holding means being adapted for holding one of said bottle groups therein;

bottle feeding means for sequentially supplying said groups of bottles to said conveying means, said bottle feeding means including first and second bottle insertion devices arranged at spaced locations along the feeding direction of the bottle conveying means, said first insertion device putting bottle groups into said holder means which are at regularly spaced locations in the series defined by said plurality of holder means, and said second bottle insertion device putting bottle groups into other holder means which are at regularly spaced locations along said series and are left vacant by said first insertion device;

each said insertion device including stationary guide means extending between a first position wherein a bottle group is supplied thereto and a second position which is vertically spaced above said first position and is disposed closely adjacent said conveyor means, said guide means having elongated guide surfaces thereon for slidably engaging and supporting the bottle group as it is moved from said first position to said second position;

each said insertion device further including bottle displacement means adapted for engaging the bottle group for displacing same from said first position into said second position and then inserting same into one of said holder means, said bottle displacing means including first movable means for engaging the bottoms of the individual bottles of the bottle group for slidably displacing said bottle group along said guide surfaces from said first position to said second position and second movable means for engaging the bottle group adjacent said second position and for pushing same into one of said holder means;

said first movable means including a bottle moving member supported for rotation about an axis, said bottle moving member having a portion thereof disposed for engaging a bottle at said first position and moving same to said second position during each revolution of said bottle moving member, the angular displacement of said bottle moving member in displacing a bottle between said first and second positions being substantially less than a complete revolution;

drive means drivingly interconnected to said bottle moving member for causing rotation thereof about said axis;

said second movable means including a bottle moving lever mounted for swingable oscillating movement about a further axis which is substantially parallel to said above-mentioned axis, said bottle moving lever being swingable back and forth between a first location wherein said lever engages a bottle which is disposed at said second position and a second location wherein the lever inserts a bottle into one of said holder means; and

motion connecting means drivingly connected between said bottle moving member and said bottle moving lever for synchronously moving same according to a preselected pattern, said motion connecting means including cam means rotating synchronously with said bottle moving member and follower means disposed in engagement with said cam means and interconnected with said bottle moving lever for causing oscillation of said bottle moving lever responsive to rotation of said cam means.

4,022,316

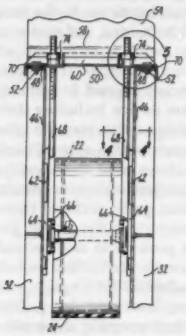
BOOT CONSTRUCTION FOR A BUCKET ELEVATOR

Edmund P. Taylor, Greencastle, Ind., assignor to Bryant-Poff, Inc., Coatesville, Ind.

Filed Feb. 11, 1976, Ser. No. 657,089
Int. Cl.² B65G *21/00*
U.S. Cl. 198—860 **6 Claims**

1. In a bucket elevator of the type comprising a pair of upright legs connected at their lower ends by a boot, a vertical adjustable pulley journalled in the boot, a bucket elevator belt trained around said pulley, a pair of upright threaded support

rods in said boot each connected at its lower end to a bearing block in which the pulley shaft is supported, the improvement which comprises a cover at the upper end of said boot, means releasably securing said cover to said boot, said cover having a pair of openings therein through which said support rods extend upwardly, a pair of nuts threaded on said support rods,



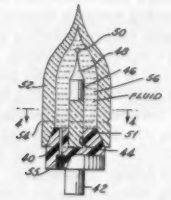
said nuts having flanges thereon disposed on the underside of the cover, said flanges being larger than said openings so that they are adapted to bear against the underside of the cover and means within said boot engaging the bottom faces of said flanges to trap the nuts vertically on said boot when the cover is secured to the boot, whereby relative rotation between the support rods and nuts effects vertical adjustment of the pulley.

4,022,317

PACKAGE FOR FRAGILE OBJECTS

Duane A. Burgeson, Ann Arbor, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.

Filed July 7, 1975, Ser. No. 593,705
Int. Cl.² B65D *81/02, 85/30*
U.S. Cl. 206—205 **4 Claims**



1. A combination protective package for tiny pellets and the like which comprises:

a. a primary inner container having a base,

b. an upright central shaft on said base having a slender tip,

c. a pellet on said tip,

d. a protective capsule sealed to said base enveloping said shaft and pellet in spaced relation thereto, and

e. means to mount and position one or more of said capsules in spaced relation to each other and to the inner walls of a second container.

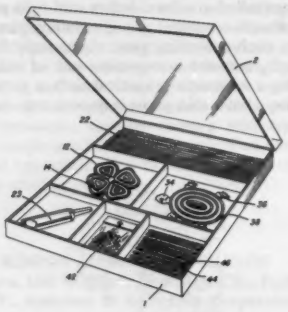
4,022,318

JEWELRY KIT WITH DECORATIVE YARN OR BEADS

Morris Goodman, Crown Imperial Jade, Box 629, Freehold, N.J. 07728

Filed Nov. 3, 1975, Ser. No. 628,606
Int. Cl.² B44D *5/00;* **G09B** *19/00*
U.S. Cl. 206—223 **6 Claims**

1. A decorative jewelry kit comprising: a container at least one preformed metal art form, said art form being shaped to resemble some commonly recognizable object, and said art form having trough-like recesses therein for receiving and retaining decorative material means therein, said material



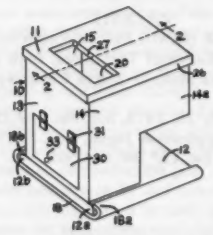
means being included with said kit, the decorative material means comprise decorative yarn of various textures and colors, full round beads, and a flexible strip having half beads fixedly attached thereon.

4,022,319

PACKAGE FOR DISPOSAL OF CHEWING GUM

Garry W. Jenkins, P.O. Box 635, Burlington, Vt. 05401

Filed Apr. 7, 1975, Ser. No. 565,818
Int. Cl.² A45C *11/00;* **B65D** *91/00*
U.S. Cl. 206—233 **3 Claims**



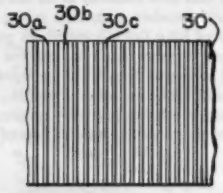
1. A combination package for holding tissues in which chewed gum is to be wrapped and also holding gum which has been wrapped in the tissues, which comprises a body casing having an open top and a cover for said casing, said casing comprising a bottom plate, a rear wall and opposing side walls which extend from the bottom plate to the top of the casing, a front wall and a transverse partition plate which extends from side wall to side wall and from the bottom plate up to the top of the casing so that it completely divides the interior in a rear compartment for holding wrapped chewed gum and a front compartment for holding fresh wrapping tissue, the wall of the front compartment having a slot therethrough for the withdrawal of fresh tissue, said cover having an opening above the rear compartment for dropping wrapped gum in the rear compartment, said rear compartment having a lower opening to the exterior through its wall for the removal of wrapped gum from the rear compartment and a movable closure for said opening in the wall.

4,022,320

RECORD STORAGE APPARATUS

Seth Paul Hadley, 643 Agnes Ave., Brielle, N.J. 08730

Filed Oct. 29, 1975, Ser. No. 626,716
Int. Cl.² B65D *85/02, 85/36*
U.S. Cl. 206—310 9 Claims



1. Apparatus for use in storing a phonograph record, video picture disc or the like comprising:

a support member;

a first layer of pressure absorbing material secured to said support member;

means adapted to cooperate with said first layer to hold said record, said disc or the like in fixed, overlying relationship with said layer;

a second layer of pressure absorbing material adapted to cooperate with said holding means in overlying said record, said disc or the like, also in fixed relationship; and

a backing member secured to a side of said second layer of pressure absorbing material remote from the record, disc or the like held in overlying relationship thereby;

with said first and second layers of pressure absorbing material being each of a dimension less than that of the playing surface of said record or disc measured in a plane parallel thereto, and with said backing member being of a dimension at least as great as that of said playing surface measured in a plane parallel thereto;

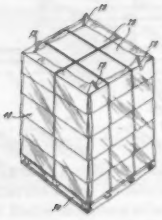
whereby said backing member and said second layer can be easily lifted away from said record, said disc or the like without substantially increasing the surface contact therewith and whereby said record, said disc or the like can be easily lifted away from said first layer, also without substantially increasing the surface contact with said record, said disc or the like.

4,022,321

HEAT SHRINKABLE BAG AND METHOD

Karl F. Barnett, Bloomfield Hills, Mich., assignor to Cadillac Products, Inc., Sterling Heights, Mich.

Continuation-in-part of Ser. No. 408,308, Oct. 23, 1973. This application July 10, 1975, Ser. No. 594,807
Int. Cl.² B65D *19/00, 65/00, 81/00*
U.S. Cl. 206—386 11 Claims



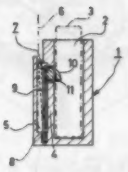
1. A preformed shrink wrap enclosure for a pallet load having a predetermined height and a top girth at least as great as any girth between the top and bottom of the load, comprising: a sleeve open at both ends and formed of heat-shrink plastic film material; and joining means joining adjacent zones of said film to one another proximate to the top end of said sleeve partially closing the open top end of said sleeve reducing the girth thereof to a girth which is less than said top girth of said load, the remainder of said sleeve having a girth which is greater than the maximum girth of said load by an amount less than the amount said sleeve will shrink in girth when subjected to heat shrinking temperatures, said reduced-girth portion of said sleeve being spaced from the bottom of said sleeve a distance greater than said predetermined height of the load to be wrapped, the bottom end of said sleeve can be readily dropped over said load until said reduced-girth portion of said sleeve contacts the top of the load to prevent further downward movement of said sleeve relative to said load.

4,022,322

CONTAINER FOR A RECORD CARRIER

Friedrich Louzil, Vienna, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 30, 1975, Ser. No. 618,218
Claims priority, application Austria, Oct. 2, 1974, 7925/74
Int. Cl.² B65D *85/672, 85/30*
U.S. Cl. 206—387 2 Claims



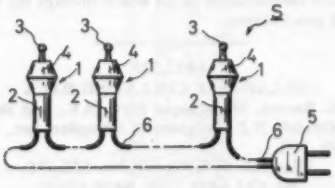
1. A container for a record carrier assembly, comprising a receptacle for a record carrier assembly, a compartment for a graphic carrier, a wall separating said receptacle and said compartment, a clamping device arranged on said wall for clamping a graphic carrier in said compartment in a clamped position when said device is actuated, and means for moving said clamping device into an actuated position in response to insertion of a record carrier assembly into the receptacle, said means comprising a lug on the said clamping device projecting into said receptacle.

4,022,323

PACKING CASE ASSEMBLY OF A SET OF DECORATION LAMPS

Yasuo Yamazaki, 4-15-33 Shimorenjaku, Mitaka, Tokyo, Japan

Filed Dec. 3, 1975, Ser. No. 637,323
Claims priority, application Japan, Dec. 5, 1974, 49-146266
Int. Cl.² B65D *85/42*
U.S. Cl. 206—419 4 Claims



1. A packing case assembly of a set of decoration lamps with the lamps being placed at the top and electric cord connected to the lamps being folded in a zig-zag manner and bundled together, said packing case assembly comprising: a case made of a plastic material having a container substantially of a cup-shape to encase the bundled electric cord; and an enlarged portion with an outer diameter larger than the outer diameter of said container and formed integrally with said

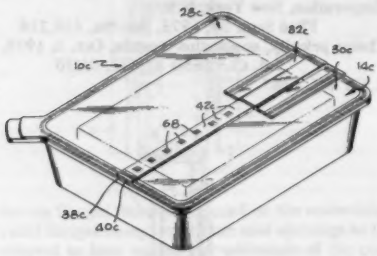
container along the upper edge of said container to receive the lamps; and a cap made of a plastic material removably fixed to said opening of said enlarged portion to cover said lamps received by said enlarged portion.

4,022,324

SEALED CONTAINER FOR STORING MEDICAL AND/OR BIO-MEDICAL ARTICLES IN STERILE CONDITION AND HAVING REMOVABLE COVER

Samuel J. Schuster, 1099 Hillside St., Monterey Park, Calif. 91754

Filed Apr. 10, 1975, Ser. No. 566,942
Int. Cl.² B65D *33/18*
U.S. Cl. 206—439 **6 Claims**



1. A sealed container enclosing an article, the container permitting sterilization of the article by a sterilizing vapor after packaging of the article, the container being adapted to store the article in sterile condition and comprising:

a tray having a peripheral rim; and

a flexible, removable cover bonded to the rim along the entire peripheral extent thereof to define with the tray a sealed interior space within which the article is retained, the cover having an overall surface area overlying the interior space and including:

transparent, bacteria-impermeable panel means defining a generally linear passage extending between portions of the rim, the passage permitting the introduction into, and removal from, the interior space of the sterilizing vapor, the panel means including a pair of overlapping margins defining the passage, the overlapping margins being joined by a series of discrete, spaced bonds along the length of the margins to increase the strength of the cover; and

a bacteria-impermeable, sterilizing vapor-permeable membrane covering the entire length of the opening, the membrane being attached to the transparent panel means by a continuous bond about the passage, the surface area of the membrane being substantially less than the overall surface area of the cover to facilitate visual identification of the article through the transparent panel means.

4,022,325

COLLAPSIBLE COLLATING RACK

Edward E. Barrett, Massapequa Park, N.Y., and Stephen J. Failla, Oradell, N.J., assignors to Swingline, Inc., Long Island City, N.Y.

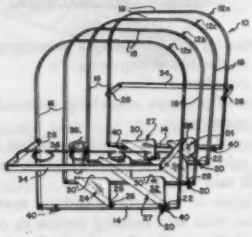
Filed Feb. 5, 1976, Ser. No. 655,496
Int. Cl.² A47F *5/08;* **B42F** *17/00*
U.S. Cl. 211—11 **13 Claims**

1. A collapsible rack comprising:

a. a plurality of partition members including a first partition member, at least one intermediate partition member and a last partition member, each of said partition members comprising an elongated base portion and a pair of side portions extending from said base portion, each of said base portions having first and second points positioned along its length and a third point positioned between said first and second points, said partition members being positioned substantially in line with and in planes substantially parallel to each other;

b. a first short linking member extending between the first of said partition members and an intermediate partition member, said first short linking member being pivotally secured to said first member at its third point and to said intermediate member at its first point;

c. a plurality of long linking members parallel to said first short linking member, each having first and second points positioned along its length and a third point positioned between said first and second points, each of said long linking members being pivotally secured at its third point to the third point on the base of one of said intermediate



partition members, having its first point secured to the first point on the base of an adjacent partition member and having its second point pivotally secured to the base of the other adjacent partition member;

d. a second short linking member parallel to said long linking members and extending between and pivotally secured to the second point on the base of the last of said intermediate members and the third point on the base of the last partition member; and

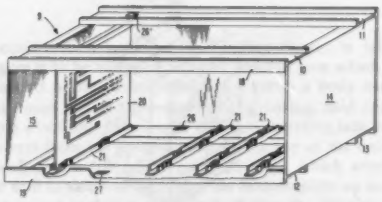
e. a plurality of guide means for defining a plurality of slanted guide surfaces extending between each adjacent pair of points at which said linking members are pivotally secured to said base portions, said guide surfaces all having a substantially common orientation.

4,022,326

DUAL ACTION RETAINING GUIDE FOR PRINTED CIRCUIT CARD RACKS

Joseph Marconi, 428 Jensen Road, Vestal, N.Y. 13850

Filed Apr. 22, 1976, Ser. No. 679,237
Int. Cl.² H05K *5/02*
U.S. Cl. 211—41 **2 Claims**



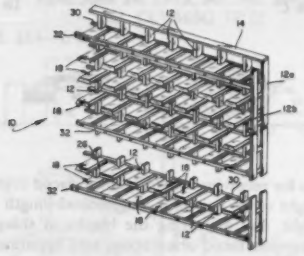
1. A retaining guide for printed circuit cards comprising an elongated channel member having a bottom wall and side walls vertically extending therefrom, said member having a non-linear undulating configuration, said side walls of said channel member defining inwardly-extending semi-circular contact surfaces in alternating spaced relationship with respect to opposing walls, said contact surfaces being so proportioned as to engage the sides of a circuit card, thereby exerting a retentive force.

4,022,327

WINE RACK

Peter B. Anderson, 101 Lynbrook Ave., Lynbrook, N.Y. 11563

Filed Oct. 16, 1975, Ser. No. 622,883
Int. Cl.² A47B 73/00
U.S. Cl. 211—74 8 Claims



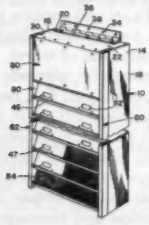
1. A bottle rack for the storage and display of wine bottles comprising at least two vertically supported load bearing standards, a plurality of bottle holders, said standards having selectively located recessed portions along their height for receiving said bottle holders, the bottle holders having slotted openings for interlocking engagement within said recessed portions to provide cantilevered support with the bottle holders being consecutively spaced to define a cradling gap between successive pairs of bottle holders and further including a barrier strip extending transversely between said standards, said barrier strip being positioned rearwardly of the bottle holders and in registration with the cradling gap to provide a protective bottle stop, said barrier strip being secured within said recessed portions on the standards.

4,022,328

FOLDING DISPLAY RACK

William D. Toland, Sherwood; Bernard C. Westgate, Jr., Hot Springs, and Kenneth N. Burks, Jr., Little Rock, all of Ark., assignors to Bradbar Mfg. Corporation, North Little Rock, Ark.

Filed Apr. 29, 1976, Ser. No. 681,466
Int. Cl.² A47B 43/00
U.S. Cl. 211—149 6 Claims



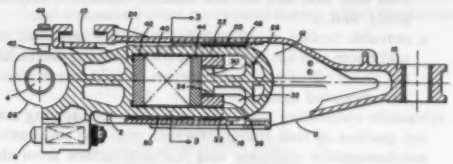
1. A display rack comprising:
an elongated back panel having a pair of coextensive side panels hinged thereto along its side edges;
a pair of elongated frame members of substantially the same length as said back panel;
a front panel member having substantially the same width as said back panel affixed at its side edges to and between the top ends of said frame members and defining thereunder a front display opening;
said frame members each having an outer rearwardly open channel along their lengths; and
a plurality of shelf members hingeably attached and substantially equally, vertically spaced along their back edges to said back panel and having their front corners pivoted with substantially the same vertical spacing between said frame members across said display opening whereby said back panel and said front panel are adapted to articulate along said hinges and pivots from a folded essentially flat position with said shelf members in substantially contiguous relationship to an opened erected position with the edges of said side panels engaged within and retained by said open channels of said frame members.

4,022,329

DRAFT RIGGING FOR RAILWAY CARS

Walter Cabbie Dilg, Elma, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 16, 1976, Ser. No. 649,890
Int. Cl.² B61G 9/06
U.S. Cl. 213—67 R 8 Claims



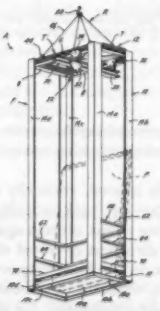
1. A draft rigging for a railway car comprising a drawbar having a forward and rearward end and a pocket for a cushioning means, a yoke disposed within the pocket, said yoke having a pair of transversely spaced longitudinally extending straps connected forwardly by (tie bars or) a yoke for pivotal connection to a coupler and connected rearwardly by a transverse rear wall, said rear wall having a substantially centrally located longitudinal stem abutment member extending inwardly toward the yoke head, an apertured shear block disposed between the longitudinal straps of the yoke, the longitudinal stem abutment member passing through the aperture in the shear block, the shear block being releasably secured to the drawbar.

4,022,330

APPARATUS FOR MOUNTING BUILDING PANELS

Joseph R. Shannon, Jr., P.O. Box 40006, Houston, Tex. 77040

Filed May 16, 1975, Ser. No. 578,127
Int. Cl.² E04G 21/00
U.S. Cl. 214—1 H 4 Claims



1. An apparatus for mounting building panels on a building structure, said apparatus being movable from a lower level to an elevated position by a supportive mechanism, comprising:
a frame structure adapted to receive at least one man thereon, said frame structure having a base portion, vertical frame members mounted with said base portion and extending upwardly therefrom and a top portion includ-

ing first and second channel members mounted with said vertical frame members in a fixed, substantially parallel spacial relation, said base portion adapted to receive a plurality of building panels thereon;

panel transferring means movably mounted with and supported by said top portion of said frame structure for raising a building panel off of said base portion of said frame structure for laterally moving the raised panel relative to said frame structure for positioning same for mounting on the building structure, said panel transferring means including:

a boom having a first end and a second end;

first and second channel trolley members, said first channel trolley member mounted on said first end of said boom and said second channel trolley member mounted on said boom between said first channel trolley member and said second end of said boom, said first and second trolley members being movably mounted with said first and second channel members, respectively; and,

a movable trolley member being movably mounted on said boom and having hoist means for raising the building panel off of said base portion of said frame structure mounted therewith; and,

releasable connecting means for releasably connecting said top portion of said frame structure with the supportive mechanism for elevating said frame structure from the lower level to the elevated position.

4,022,331

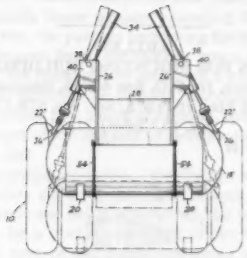
ANHYDROUS AMMONIA TANK CARRIER FOR FARM TRACTORS

Roland C. Bean, and Bruce L. Bean, both of Star Rte., Burley, Idaho 83318

Filed Sept. 8, 1975, Ser. No. 611,178

Int. Cl.² B65P *1/00*

U.S. Cl. 214—1 R **6 Claims**



1. An anhydrous ammonia tank carrier for use on a tractor capable of towing ground-working equipment at one end, the carrier comprising:

a. a pair of laterally spaced, vertically extending tank support members having tank-securing bottom ends arranged for securing a tank therein against displacement in the longitudinal direction of travel of a tractor,

b. mounting means on the tank support members arranged for attachment to a tractor at the end of the latter opposite the implement-towing end for positioning the laterally spaced tank support members to support a tank transversely across said end of the tractor,

c. an extensible fluid pressure piston-cylinder unit mounted on each tank support member for vertical extension and retraction relative to said tank-engaging bottom ends, and

d. connecting means on the bottom ends of the piston-cylinder units for connection to a tank to be carried, for raising the tank into engagement with the tank-securing bottom ends of the tank support members.

4,022,332

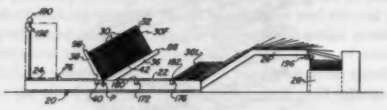
APPARATUS FOR ORIENTING CASE BLANKS

Anthony Freakes, Leonia; George A. Ventz, Clifton, both of N.J., and Arthur I. Dove, Flushing, N.Y., assignors to General Corrugated Machinery Co., Inc., Palisades Park, N.J.

Filed July 16, 1975, Ser. No. 596,225

Int. Cl.² B65G *57/14*

U.S. Cl. 214—6 C **16 Claims**



1. Apparatus for receiving blanks in given faced orientation within an upright stack having a longitudinal length and an altitudinal height, and delivering the blanks in shingled arrangement in reverse faced orientation, said apparatus comprising:

a frame;

a plurality of laterally spaced, longitudinally extending movable means mounted on the frame to establish a longitudinal conveyor having an input end and an output end, and providing a longitudinal path of travel for the blanks between the input and the output end;

drive means for moving the plurality of laterally spaced, longitudinally extending movable means to convey the blanks along the longitudinal path of travel in a downstream direction between the input end and the output end;

a first fork mounted upon the frame for pivotal movement about a laterally extending pivotal axis, said first fork including a plurality of longitudinally extending, laterally spaced first tines, the lengths of at least some of the first tines being greater than the height of the stack;

a second fork mounted upon the frame for pivotal movement independent of the first fork about the same laterally extending pivotal axis, said second fork including a plurality of longitudinally extending, laterally spaced second tines, the lengths of at least some of the second tines being great enough to support the length of the stack;

first actuating means for pivotally moving the first fork independent of the second fork between a first position wherein the first tines extend in an altitudinal direction normal to and intercepting the longitudinal path of travel of the blanks, and a second position wherein the first tines extend in a first longitudinal direction parallel to and juxtaposed with said path of travel;

second actuating means for pivotally moving the second fork independent of the first fork between a first position wherein the second tines extend in a second longitudinal direction parallel to and juxtaposed with said path of travel and opposite to said first longitudinal direction, and a second position wherein the second tines extend in an altitudinal direction at an obtuse angle to said second longitudinal direction and intercept said path of travel; and

a control system including control means located along the path of travel of the blanks for activating the first and second actuating means in response to the location of the blanks such that upon disposition of the stack at a predetermined upsetting location wherein the stack is juxtaposed with the first and second forks, with each fork positioned at the first position thereof, the first and second actuating means will effect synchronized rotational movement of the forks in the same direction of rotation to the second positions thereof for upsetting the stack and placing the blanks in shingled arrangement upon the conveyor for delivery to the output end thereof, with the faced orientation of the delivered blanks being the re-

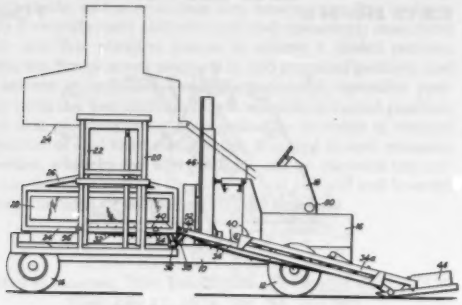
verse of the faced orientation of the blanks when in the stack.

4,022,333

BALE STACKING APPARATUS

Gordon M. Haugen, Cornelius, Oreg., assignor to J. A. Freeman & Son, Inc., Portland, Oreg.

Filed June 26, 1975, Ser. No. 590,434
Int. Cl.² B65G *57/32*
U.S. Cl. 214—6 B **5 Claims**



1. A bale stacking apparatus comprising
a. a bale receiving platform having opposite ends and sides,
b. loading means arranged to move bales longitudinally onto said platform,
c. said platform having a stop at one end and being arranged to receive at least two bales in a row from said loading means,
d. drive means operating said loading means,
e. control means for said drive means having operative portions thereof in the path of said bales moving on said loading means,
f. said control means causing said loading means to move the leading end of a first bale into engagement with said stop,
g. said control means also causing said loading means to stop a following bale such that the trailing end of the following bale is even with a predetermined point,
h. a reciprocating pusher mechanism on said apparatus arranged to move said bales laterally in their loaded position from said loading means,
i. and drive means for said pusher mechanism,
j. whereby rows of bales made up of a first bale and a following bale as loaded provide flush ends for the stack and any excess space between bales in a row is located interiorly of the stack.

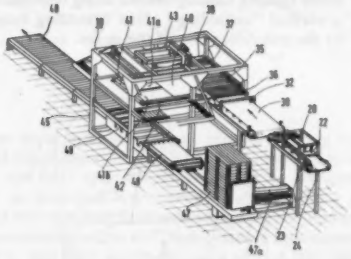
4,022,334

APPARATUS FOR STACKING SACKS ONTO PALLETS

Harry Lässig, Hamburg-Schenefeld, Germany, assignor to Firma Fordertechnik Hamburg Harry Lassig, Hamburg-Schenefeld, Germany

Filed June 26, 1975, Ser. No. 590,633
Int. Cl.² B65G *57/24*
U.S. Cl. 214—6 P **3 Claims**

1. An apparatus for stacking sacks onto pallets, including conveyor means for feeding sacks to the apparatus, transfer means, a packing plate and an elevator platform wherein the sacks are transferred onto the packing plate by means of a conveyor assembly and a transfer bar movable perpendicularly to the feed direction of the sacks, the packing plate is arranged in a position laterally spaced from the upstream end of the conveyor means and defines transfer means for transferring sack disposed on the packing plate onto a pallet which is palced on the elevator platform, the elevator platform is adapted to be selectively raised or lowered whereby after setting down a layer of sacks onto the pallet or onto one layer or several layers of sacks already stacked on the pallet the elevator platform is lowered and subsequently again moved upwardly toward the packing palte, said apparatus cahracterized by the combination of:
a. a sack shaping station including a sack jolting and flattening assembly in which the contents of the sacks are evenly distributed throughout the confines of the sack, and a surfacing palte for trimming the upper surface of the sacks into a smooth substantially plane shape while the sacks are being moved along a conveyor, the surfacing plate being automatically adjustable in height to the thickness of a sack, in exerting a substantailly constant flattening pressure;
b. a sack distribution station including a variable speed conveyor and a sack rotating assembly;
c. a sack row-forming roller track including a stop ledge adjacent the upstream end of the roller track looking in the sack feeding direction, and sack row transferer means movable transversely of the longitudinal feed direction of the sack row forming roller track, the sack row transferer means adapted to perform an active transfer movement and a passive return movement during which the transfer means is displaced upwardly;



d. a sack row magazine disposed intermediate the sack row-forming roller track and a packing plate assembly, the sack row magazine adapted to receive rows of sacks being transferred thereto from the sack row-forming roller track and to be moved into a position substantially overlying the packing plate assembly;
e. a two-part packing plate assembly having upper and lower surfaces, the lower surfaces being arcuately shaped in defining downwardly bulging portions of an increasing depth from two opposite lateral edges towards a center line of the packing plate assembly, and associated guide bars adjacent mutually opposed lateral edges of the packing plate assembly, and a sack stripping or transfer member disposed above the packing plate assembly and adapted to be lowered toward the packing plate assembly when the sack row magazine is being moved from a position substantially overlying the packing plate into a position intermediate the packing plate assembly and the sack row-forming roller track;
f. an elevator platform adapted to receive a pallet; and
g. a roller track for removing loaded pallets from the apparatus.

4,022,335

SPREADING-UNLOADING ROTARY SWEEP APPARATUS OF THE HOLE-FORMING SLEEVE TYPE

Charles F. Lambert, Jr., Louisville, Ky., assignor to Clayton & Lambert Manufacturing Co., Buckner, Ky.

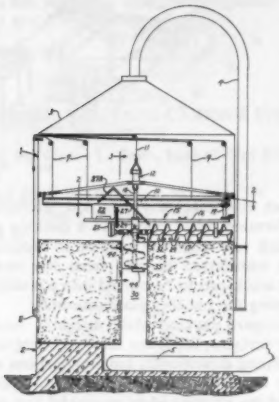
Continuation-in-part of Ser. No. 464,124, April 25, 1974, abandoned. This application July 21, 1975, Ser. No. 597,518
Int. Cl.² B65G *65/32, 65/38*
U.S. Cl. 214—17 CB **10 Claims**

1. A spreading/unloading rotary sweep apparatus of the hole-forming sleeve type for use in filling and unloading a given silage storage tank or silo containing a vertically mov-

able nonrotatable supporting assembly, which has a vertical center axis, comprising:

A. a rotary sweep mounted on said assembly for vertical raising and lowering movement therewith along said vertical center axis during respective silo filling and unloading operations, said sweep having
1. opposite outer spreading and unloading sides, and
2. on one side of said center axis, a single fully-exposed long sweep auger of the radius type with corresponding opposite silage spreading and unloading sides;

B. drive means for reversibly rotating the sweep slowly about said vertical center axis of the assembly and said single sweep auger rapidly about its own long horizontal axis,
1. said drive means being operative to rotate both the sweep and said single sweep auger
a. in one direction with their corresponding silage spreading sides facing in the advancing direction during filling and
b. in the opposite direction with their corresponding silage unloading sides facing in the advancing direction during unloading, the unloading stream normally flowing radially inward along opposite sides of a vertical "unloading" plane extending tangentially to the unloading side of the auger, and



2. said single sweep auger rotating in each direction with its lower half moving forwardly toward its advancing side; and

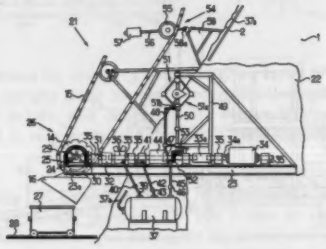
C. a vertically short open-ended cylindrical discharge sleeve connected to depend from the sweep in concentric relationship to said vertical center axis for vertical and rotary movements as a unit therewith,
1. said sleeve having cylindrical outer and inner peripheral and bore walls respectively,
2. said cylindrical peripheral wall, being operative during the silage filling operation, to form an upwardly rising discharge hole,
3. said cylindrical bore wall, being operative during the silage unloading operation, to receive and direct the unloading silage downwardly through said discharge hole, and
4. the upper end portion of said discharge sleeve having, on its long auger side, a silage overflow edge
a. which is vertically spaced below a horizontal plane tangential to the bottom side of the long auger, and
b. which extends from the inner side edge of the discharge stream horizontally through said vertical unloading plane to the outer side edge of said stream so that the whole width of the unloading silage stream cascades over said overflow edge into the sleeve in a free-flowing substantially unobstructed condition.

4,022,336

APPARATUS FOR CONVEYING BULK MATERIAL

Henri Pelletier, 11 Avenue de Versailles, 93220 Gagny, France

Filed Mar. 1, 1976, Ser. No. 662,733
Claims priority, application France, Mar. 6, 1975, 75.07062
Int. Cl.² B65G *67/24*
U.S. Cl. 214—44 R **7 Claims**



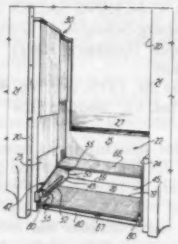
1. Apparatus for conveyance of bulk material, such as minerals, over a vertical or steeply inclined path, comprising an endless conveyor bearing buckets between a departure station and an arrival station located at a lower altitude than the departure station, the buckets being, in use of the apparatus, full during their descent and empty during their upwards return; motion take-off means driven by the conveyor and coupled to an energy transformation unit; a compressed air reservoir; an air compressor for feeding the compressed air to the reservoir and driven by the motion take-off means; and an air turbine operable by compressed air from said reservior and associated with the energy transformation unit to govern the speed of rotation of a shaft of said unit.

4,022,337

HOIST MECHANISM FOR USE IN A VEHICLE SUCH AS A BUS

Josef Eichenhofer, Brampton, Canada, and Karl Schubert, Cleveland, Ohio, assignors to Urban Transportation Development Corporation Ltd., Toronto, Canada

Filed Oct. 17, 1975, Ser. No. 623,458
Int. Cl.² B60P *1/46*
U.S. Cl. 214—75 R **21 Claims**



1. A hoist mechanism of the type having a plurality of platform means providing a plurality of respective movements therebetween the lifting means for lifting of lowering at least some of said platform means, said hoist mechanism being adapted for mounting in a step-well of a transportation vehicle, said step-well being defined, at its front end, by a door frame of said vehicle, by upright side walls, by an upright end

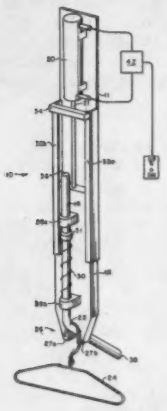
wall and by a horizontal bottom, said mechanism comprising: vertical hoisting means arranged to be secured to the floor of said vehicle; said vertical hoisting means supporting a first platform means arranged for selective, generally horizontal movement in the direction towards and from the front end of said stepwell, to assume an extended position wherein at least a portion of said first platform means extends beyond the front end of said step-well, outside of said vehicle, or to assume a retracted position wherein a portion of said platform is generally coincident with and forming the bottom of the step-well of said vehicle; and intermediate step means extending horizontally forwardly from said rear wall and operatively associated with said first platform means to assume a folded position when the first platform means is in said extended position, and to assume an unfolded, generally horizontal, operative position when the first platform means assumes retracted position; said first platform being arranged to be movable in vertical direction of said hoist means when disposed in said extended position, whereby the first platform can be elevated into coplanar relationship with the floor of said vehicle, and lowered below the level of the bottom of said step-well.

4,022,338

CONVEYOR LOADER DEVICE

Milton P. Laursen, 7504 Eureka Ave., El Cerrito, Calif. 94530

Filed July 12, 1976, Ser. No. 704,460
Int. Cl.² B66B *17/00*
U.S. Cl. 214—89 **5 Claims**



1. An apparatus for loading an object onto a conveyor comprising

a vertically arranged elongated fixed member,

a first elongated movable member arranged parallel to and longitudinally movable relative to said fixed member,

means for retaining said object, said means located proximate the lower end of said first movable member.

a second elongated movable member arranged parallel to, movable relative to, and movable with said first movable member,

means for supporting said object, said means located proximate the lower end of said second movable member and adapted to engage said means for retaining said object when said first and second movable members are in the lowered position.

means for lifting and lowering said first movable member relative to said fixed member,

means for aligning said means for supporting said object, with said conveyor, and

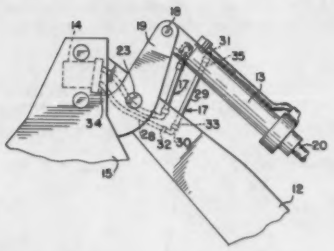
means for disengaging said means for retaining said object when said means for supporting said object and said conveyor are aligned to receive said object whereby said alignment and disengagement occurs upon stopping of the vertical movement of the first movable member while continued vertical movement of the second movable member releases the object.

4,022,339

FLUID OPERATED APPARATUS

Harold F. Bieringer, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 13, 1975, Ser. No. 631,573
Int. Cl.² E02F *3/70*
U.S. Cl. 214—140 **10 Claims**



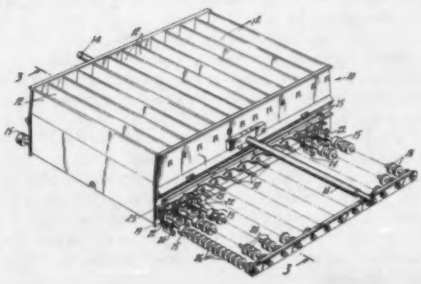
1. In an apparatus having a base portion carrying a pressurized fluid supply means, an arm pivotally mounted to the base portion, and fluid operated means swingably associated with the arm, an improved hose assembly for conducting pressurized fluid between said fluid supply means and fluid operated means comprising: a first stiff, high pressure hose connected at one end to said fluid supply means; a second stiff, high pressure hose connected at one end to said fluid operated means, and a rigid coupling fixedly connected between the other end of said first hose and the other end of said second hose adjacent said arm, said coupling being supported solely by said hoses for translation substantially directly with pivotal movement of said arm while effectively maintaining a preselected relationship between said hose other ends adjacent said coupling whereby said hose assembly is effectively maintained in a preselected configuration notwithstanding changes in the relative disposition of said fluid operated means and said base portion.

4,022,340

BIN FOR MAIL SORTING APPARATUS

Andrew D'Aloia, New York, N.Y., assignor to American Technical Industries, Inc., Mount Vernon, N.Y.

Filed Aug. 12, 1975, Ser. No. 603,816
Int. Cl.² B65B *21/02;* **B65G** *43/00*
U.S. Cl. 214—307 **1 Claim**



1. A mail transporting bin defining a plurality of parallel

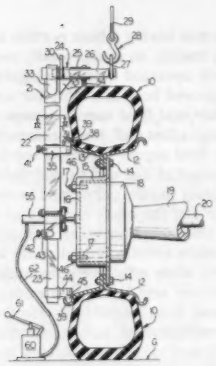
vertical mail holding slots each such slot being open at its top end, a normally closed pivotably movable door closing each slot along its bottom end, each movable door being pivotable about an axis substantially contiguous with one longitudinal edge thereof, and a lever rigidly affixed to one end of the door whereby said door may be held in a closed position, wherein the improvement comprises a tab integrally formed with the door at the end opposite the lever said tab having a first part extending at a right angle to the door and a second part extending from the first part and parallel to the door, resilient door opening and damping means including a spring engaging the second part of the tab for biasing the door toward an open position and for preventing noise and vibration upon the opening movement of the door, a plurality of rollers, a plurality of axles supporting the rollers the number of such axles being equal to the number of doors, and an arm attached to each such axle for holding one end of the spring in a fixed position.

4,022,341

LIFTING DEVICE FOR TIRE-RIM ASSEMBLIES

John F. Lindquist, Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 11, 1976, Ser. No. 665,835
Int. Cl.² B60B *29/00*
U.S. Cl. 214—330 **8 Claims**



1. A lifting device for heavy, large tire-rim assemblies having a rim with an exposed outer ring flange curved in radial section and open toward the assembly center, comprising:

an upright rigid standard having a pair of rigid portions one telescoping into the other for extending the length of the standard,

a rim engaging bracket outstanding from one standard portion and having a portion shaped complementary to the rim flange interior shape for seating in and engaging the flange on the rim,

another rim engaging bracket outstanding from the other standard portion and having a portion shaped complementary to the rim flange interior shape for seating in and engaging the flange on the rim at a diametrically opposite position across the rim from said first bracket, said shaped bracket portions locking the standard to the wheel rim when so seated in said rim flange,

means for locking said standard portions in extended position with said brackets seated in and engaging the rim and the standard upright beside the tire-rim assembly,

a beam secured to and outstanding from the upper end of the standard extending in the same direction therefrom as said brackets extend, and

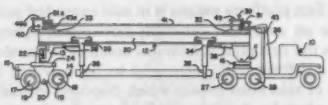
a lifting attachment on the beam spaced from said standard whereby a tire and rim assembly may be suspended on said device in an upright position for removal from and replacement upon a vehicle wheel.

4,022,342

SELF-LOADING CARRIER WITH TRAILING END BOGIE

Gibson E. Brock, R.D. 5 Persimmon Road, Sewickley, Pa. 15143

Filed Nov. 4, 1975, Ser. No. 628,769
Int. Cl.² B60P *3/40*
U.S. Cl. 214—392 **15 Claims**



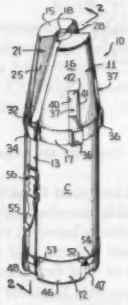
1. A rubber-tired vehicle for plant roadway and off-highway carriage of heavy elongated loads comprising a tractor unit, an independently driven trailing end double axle bogie unit, an inverted generally U-shaped elongated load-carrying bridge supported at its front and rear ends by the tractor unit and bogie unit respectively so as to permit rotation of each unit with respect to the bridge about a vertical pivot carried by that unit, means attached to the bridge for carrying loads slung below it, means for rotating the bogie around its pivot, through an angle up to 90° each way from the long axis of the bridge, and control means for controlling those rotating means while the vehicle is in motion responsive to the steering of the tractor about its pivot so as to rotate the bogie in the same direction as the tractor and to the same extent.

4,022,343

PROTECTIVE DEVICE FOR COMPRESSED GAS CYLINDERS

John Eric Richardson, P.O. Box 1004, El Dorado, Ark. 71730

Filed Sept. 17, 1976, Ser. No. 724,233
Int. Cl.² B65D *7/42, 25/00, 7/00*
U.S. Cl. 220—3 **16 Claims**



1. A device for protecting a compressed gas cylinder of the type including a bottom end portion and an opposite top end portion with the latter having a valve assembly comprising a pair of caps, each of said caps being of a generaly cup-shaped configuration defined by an end wall and a peripheral skirt, said caps being adapted to be disposed in opposed relationship to each other, a first of said caps defining a first chamber adapted to receive therein a bottom end portion of a compressed gas cylinder, a second of said caps defining a second chamber adapted to receive therein a top end portion of a compressed gas cylinder and a valve assembly carried by the top end portion, a first plurality of aperture means in the

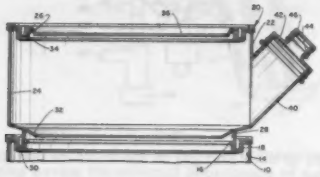
peripheral skirt of said first cap, a second plurality of aperture means in the peripheral skirt of said second cap, and strap means for passing through said first and second plurality of aperture means to captively retain a compressed gas cylinder therebetween.

4,022,344

ATTACHMENT FOR A LIQUID CONTAINER

Louis S. Roamer, 1219 Alton St., Wilmington, Calif. 90744

Filed Nov. 10, 1975, Ser. No. 630,738
Int. Cl.² B65D *7/00, 25/00*
U.S. Cl. 220—4 A **2 Claims**



1. In combination with a liquid container having an access opening, an annular channeled lid anchoring rim surrounding said access opening and mounted within said liquid container, said anchoring rim normally cooperating with a lid to close said container, an attachment connectable with said rim upon removal of said lid, said attachment comprising:

an elongated housing having at the inner end an inner opening and at the outer end an outer opening, an attaching ring mounted upon said housing about said inner opening, said attaching ring connectable in a tight fitting manner with said anchoring rim, a second anchoring rim mounted upon said housing about said outer opening, said lid being connectable in a tight fitting manner with said second anchoring rim;

side opening means provided in the side walls of said housing for pouring the liquid from said liquid container;

said side opening means includes a spout extending outwardly from the side wall of said housing;

said side opening means being closeable by closing means;

said closing means comprises an enlarged cap screw threadingly attached to said spout and a smaller sized cap screw threadingly connected to said large sized cap; and

an annular inwardly extending flange attached to said housing and located within said housing adjacent said inner opening, said flange being slightly inclined in a downwardly depending manner from the horizontal and being thin in cross-section, said annular inwardly extending flange functioning to cause any liquid within said housing to be drained back into said liquid container.

4,022,345

DRUM WITH HANDLING RINGS

Klaus Siegfried Butz, Anaheim, Calif., assignor to Advanced Chemical Technology, City of Industry, Calif.

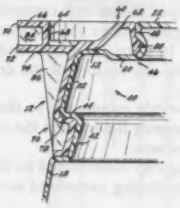
Filed Mar. 15, 1976, Ser. No. 666,595
Int. Cl.² B65D *7/42, 25/00*
U.S. Cl. 220—71 **5 Claims**

1. A handling ring for attachment to a drum having a first recessed wall portion adjacent an end of the drum, merging with it and recessed radially inwardly away from the end forming an undercut circumferentially-extending step between the shoulder of the drum and the end of the drum, and having a second groovelike recessed wall portion extending circumferentially on the side of the drum adjacent its shoulder and having a brow portion overhanging the second recessed portion, said handling ring comprising:

a hub portion disposed on a circle of diameter substantially equal to the diameter of said first recessed wall portion;

a circular rim portion integral with said hub portion, having a diameter equal to the largest diameter of the drum and coextensive with the end of the drum; and,

a clamping portion including a surface adapted to substantially conform to the second recessed portion and the brow portion;



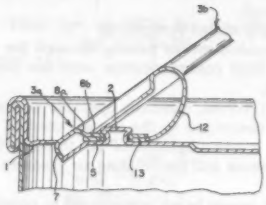
whereby said hub portion fits into the undercut first recessed wall portion and said clamping portion fits into the groove-like second recessed wall portion to hold the ring in place on the drum.

4,022,346

HOLD DOWN MECHANISM FOR LANCED TAB

Nick S. Khoury, Worth, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 684,685
Int. Cl.² B65D *41/32*
U.S. Cl. 220—273 **10 Claims**



1. An improved easy-opening end closure of the type comprising an end panel and a pull tab, said end panel having a score line formed therein defining an opening flap and also having tab securing means, said pull tab comprising a nose portion and a grasping portion, said nose portion having means for rupturing said score line consequent to a predetermined displacement of said pull tab relative to said end panel and further having an integrally formed hingeable panel member cooperating with said securing means to attach said pull tab to said end panel; the improvement comprising a force-distribution tether reacting between said pull tab and said securing means to ameliorate stresses on said hingeable panel member during opening of said closure, said tab securing means comprising a rivet integrally formed in said end panel, said pull tab being completely formed from a single piece of sheet material and said tether being provided by material displaced to form said grasping portion of said pull tab.

4,022,347

APPARATUS FOR PUMPING AND DISPENSING LIQUID FROM PHARMACEUTICAL BOTTLES

Terrance O. Noble, 1758 Walnut Lane, Eagan, Minn. 55121

Filed Mar. 5, 1976, Ser. No. 664,262
Int. Cl.² B65D *83/06*
U.S. Cl. 222—1 **21 Claims**

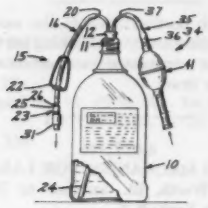
1. Apparatus for dispensing liquid from a top-opening, necked container, comprising, in combination:

A. generally cylindrical stopper means constructed to fit

into the neck of the container with a substantial portion of the generally cylindrical outer surface of the stopper means in conforming engagement with the inner surface of the container neck;

B. delivery means comprising

1. first conduit means at least a portion of which is formed from resilient material, the first conduit means passing through the stopper means and comprising
   a. an inlet end spaced from the stopper means a sufficient distance to permit the inlet end to extend to a point proximate the bottom of the container;
   b. an outlet end;
   c. a dispensing nozzle connected to the outlet end for smoothly dispensing liquid from the outlet end of the first conduit means;
2. a drip-preventing cap constructed to fit over the open end of the nozzle during periods of nonuse;



3. normally closed means disposed on the resilient portion of the first conduit means and operable in the connection therewith for controlling the flow of liquid therethrough;

C. flow initiating means comprising

1. second conduit means passing through the stopper to establish fluid communication with the inside of the container;
2. and check valved, manually operable air pump means operably connected to the second conduit means for affording a one-way flow of air through the second conduit means and for building air pressure within the container;

D. the stopper means being constructed to permit the slow leakage of pressure from the container and to preclude pressure within the container from being sustained for excessive periods of time.

4,022,348

STORAGE AND SHIPPING CONTAINER FOR GAS FILLED PELLETS

David E. Solomon, Ann Arbor, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Jan. 16, 1975, Ser. No. 541,446
Int. Cl.² B67B 7/24
U.S. Cl. 222—3 **4 Claims**

2. A package device for safe shipping of a quantity of pellets containing a gas which comprises:

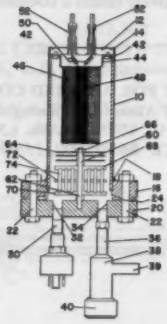
a. an outer container,

b. a closure to seal said outer container movable to permit loading and removal of an inner container,

c. one or more inner containers lodged and secured inside said outer container to occupy a portion of the space within said outer container,

d. a plurality of pellets containing a gas within said inner container, and

e. a cartridge of material which is a sorber for the gas contained in said pellets supported in said outer container together with said inner container, said sorber material being in a state of receptivity to the gas contained in said



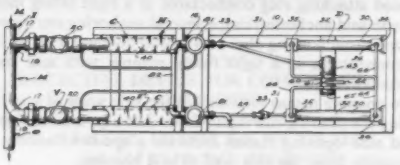
pellets to sorb said gas in the event of breakage of said pellets.

4,022,349

MUD HEATER AND PUMP THEREFOR

James P. McMullan; Kermit E. Giddens, and Melville E. Borst, all of 2630 Seaman, El Monte, Calif. 91733

Filed Aug. 11, 1976, Ser. No. 713,274
Int. Cl.² B67D 5/14
U.S. Cl. 222—54 **9 Claims**



1. A drilling mud tempering apparatus comprising a plurality of elongate cylinders with open rear sides and closed forward ends with inlet and outlet ports, an inlet pipe extending from a source of mud to be tempered and connecting means between the inlet pipe to the inlet ports of the cylinders, an outlet pipe to deliver tempered mud to mud testing means and connecting means between the outlet pipe and outlet ports of the cylinders, valve means to control the flow of mud in the inlet pipe into the cylinders and the flow of mud in the cylinders into the outlet pipe, pistons shiftably engaged in the cylinders, and having rods projecting rearwardly therefrom and from the cylinders, drive means for the pistons including cylinder and ram units spaced rearward from the cylinders and having rams drivingly connected with the rods, control means intermittently directing fluid from a source of motive fluid to the cylinder and ram units, whereby the pistons are shifted to draw mud into and discharge mud from the cylinders, heating means for the cylinders comprising heat sinks about the exteriors of the cylinders and electric resistance heater units engaging the heat sinks and control means comprising first thermocouples within the cylinders to sense the temperature of mud in the cylinders and connected with a control circuit for said control means whereby the cylinder and ram units for cylinders into which mud has been drawn are actuated to cause discharge of that mud when said mud has reached a predetermined temperature and second thermocouples to sense the temperature of the cylinders and connected with a power circuit to the heater whereby power to the heater units is shut off when the cylinders related thereto reach a predetermined temperature.

4,022,350
WATER GUN

Alan B. Amron, 70 Hofstra Drive, Plainview, N.Y. 11803

Continuation-in-part of Ser. No. 630,259, Nov. 10, 1975, abandoned. This application July 8, 1976, Ser. No. 703,315
Int. Cl.² A63H 3/18
U.S. Cl. 222—79 3 Claims

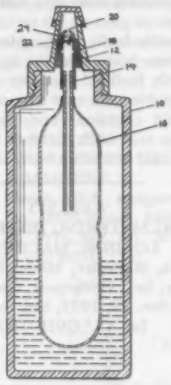
1. In a toy water gun, the combination comprising:
a. a housing having the external appearance of a pistol and including a barrel, a handle and a trigger guard;
b. an aperture formed in said barrel;
c. the aperture being provided with a removable plug;
d. the barrel including a reservoir accommodating water introduced through said aperture;
e. the handle including a first chamber accommodating electrical means and water distribution means;
f. said water distribution means communicating with said reservoir and a nozzle provided in the barrel;
g. a trigger disposed within said trigger guard and including switch means;
h. said water distribution means including a motor, a pump and a second chamber;
i. said motor and pump being energized by said electrical means when said switch means is actuated by said trigger;
j. said second chamber being provided with intake and exit valves operating in sequence, whereby a series of spurts of water is drawn from the reservoir through the intake valve into the second chamber and dispensed therefrom through the exit valve and said nozzle when said motor and pump are energized;
k. said handle being provided with closure means.

4,022,351
FOAM DISPENSER

Hershel Earl Wright, 12 Eighth Drive, Decatur, Ill. 62521

Filed Apr. 3, 1975, Ser. No. 564,700
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² B65D 37/00
U.S. Cl. 222—145 14 Claims

1. A foam dispensing device comprising:
a. a flexible container for holding a foamable liquid having a dishcarge port,
b. a porous member separating the area adjacent said discharge port and the inside of said container,
c. air bag means disposed within the container for holding an air supply isolated from said liquid,
d. conduit means communicating between the porous member and the air bag means, and including means permitting an air flow into the air bag means, and
e. a flow directing means associated with the conduit means for directing air from inside the air bag means through the conduit means and into the porous member while the foamable liquid is being directed into the porous member

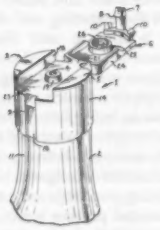


from inside of said container during pressurization of the container.

4,022,352
CONTAINER COVER AND SAFETY CLOSURE

Harold T. Pehr, 3920 W. 96th St., Overland Park, Kans. 66209

Filed Apr. 26, 1976, Ser. No. 680,524
Int. Cl.² B67D 5/32
U.S. Cl. 222—153 14 Claims



1. A safety container comprising:
a. container body having a side wall and a top wall, said top wall having a material dispensing aperture;
b. a closure member hingedly mounted on said top wall, said closure member being defined by a wall portion having a peripheral edge;
c. means on said closure member for closing the material dispensing aperture when said closure member is in covering relation with said material dispensing aperture;
d. a latch member on one of said closure member and container, said latch member extending from the peripheral edge of said wall portion of said closure member;
e. cooperating means on the other of said closure member and said container and on said latch member and engageable one with the other for retaining said closure member in covering relation with said material dispensing aperture;
f. resilient means on one of said closure member and said container for urging said cooperating means into retaining engagement, a portion of said closure member being movable toward said container against resistance of said resilient means to permit separation of said cooperating

means on said latch member and other of said closure member and container; and

g. said cooperating means for retaining said closure member in covering relation with said material dispensing aperture includes:

1. a downwardly inclined shoulder on said side wall of said container body; and

2. an upwardly inclined shoulder on said latch member and engageable with said downwardly inclined shoulder on said container body whereby said resilient means urge said latch member shoulder into engagement with said container body shoulder.

4,022,353

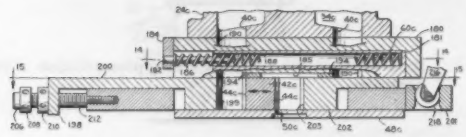
NON-SHEARING METERING DISPENSER FOR SHELL LOADING MACHINES

Robert N. Hamlin, Stillwater, Minn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Nov. 28, 1975, Ser. No. 635,897

Int. Cl.² G01F *11/10*

U.S. Cl. 222—276 **10 Claims**



1. A dispenser for metering discrete predetermined volumes of particulate material, comprising, in combination:

supply hopper means for containing particulate material, said supply hopper means having an outlet opening communicating with a lower surface thereof;

means forming an upper surface confronting said lower surface and spaced beneath said supply hopper means, said upper surface being interrupted by a discharge port spaced laterally away from said outlet opening;

charging plate means for metering and dispensing material from said supply hopper to said discharge port, said charging plate means being located between said supply hopper and said upper surface-forming means or reciprocating movement relative thereto;

said charging plate means being formed with a trap chamber of predeterminded volume extending therethrough, and being reciprocably movable between a first position in which said trap chamber is aligned beneath said outlet opening for receiving a charge of particulate material therefrom, and a second postion in which said trap chamber is aligned above said discharge port for delivering said charge thereto;

and shear slide means for preventing shearing of said particulate material, said shear slide means being interposed between said supply hopper and said charging plate means and supported for reciprocating movement, in directions parallel to said movements of said charging plate means, between a normal position and retracted position, said shear slide means having a lip portion receivable between and cooperable with said outlet opening and said trap chamber to define a loading passage therewith when said shear slide means is in said normal position and said charging plate means is in said first position;

said shear slide means and said charging plate means being formed with surfaces closely mating with said lower and upper surfaces for preventing said particulate material from escaping therebetween during reciprocating movements thereof;

together with means yieldingly biasing said shear slide means to remain in said normal position stationary with respect to said supply hopper means during movement of said charging plate means from said first to said second positions;

said shear slide means being constructed and arranged for movement toward said retracted positions by interference with particulate material trapped between said trap chamber and said lip portion during occlusion of said loading passage by movement of said charging plate means from said first to said second position thereof, and for retaining the trapped material until returned to said normal position by said biasing means during return movement of said charging plate means towards said first positions thereof.

4,022,354

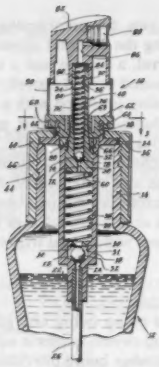
ACCUMULATOR RELEASE PUMP

Paul M. Kotuby, Naugatuck, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn.

Filed Feb. 17, 1976, Ser. No. 658,583

Int. Cl.² G01F *11/02*

U.S. Cl. 222—321 **8 Claims**



1. A finger operable accumulator release pump adapted to be mounted on a container and dispense liquid therefrom when a predetermined pressure is developed above the liquid by finger operation of said pump, said pump comprising:

A. a housing defining

1. a pump chamber; and

2. an inlet to the pump chamber;

B. check valve means located in said housing inlet to prevent return flow of liquid therethrough;

C. a plunger telescopically received for reciprocal movement from and to a home position in said pumping chamber and making a sliding piston fit therewith, reciprocation of said plunger from home position developing pressure above the liquid, said plunger having

1. an outlet passage therethrough having an axis and substantially uniform cross-sectional size and shape;

2. at least one by-pass groove extending in the general direction of the outlet passage axis along the inner surface of and intermediate the ends of said outlet passage;

3. at least one land defined by the inner surface of said plunger outlet passage adjacent said by-pass groove at the same location therewith relative to the outlet passage axis;

D. pressure actuated accumulator valve means mounted for reciprocal movement in said outlet passage, guided by the inner surface of said outlet passage and said land, to

1. close said by-pass groove when said plunger is at its home position and said accumulator valve is at one extreme of its reciprocal travel; and

2. open said by-pass groove when the predetermined pressure is developed by reciprocation of said plunger from its home position to reciprocate said accumulator

valve means a predetermined distance from said one extreme to a position adjacent said by-pass groove and land; and

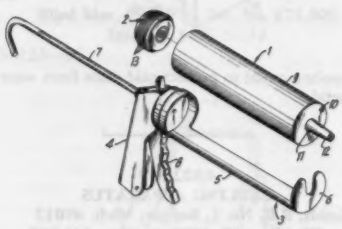
E. means for urging said accumulator valve means to said one extreme of its reciprocal travel.

4,022,355

CARTRIDGE FOR CONTAINING AND DISPENSING VISCOUS MATERIAL

George Sabaka, Box 123, R.D. 2, New Oxford, Pa. 17351

Filed Mar. 26, 1976, Ser. No. 670,652
Int. Cl.[2] G01F *13/00*
U.S. Cl. 222—327 11 Claims



1. An improved cartridge for containing and dispensing a viscous material, said cartridge including an elongated tubular member having a cylinderical inner surface, said tubular member having at one end a fixed wall having a dispensing opening therethrough, the improvement comprising a resilient, enclosed member, disposed at the end of said tubular member opposite said fixed wall, said resilient, enclosed member being slidably mounted within said tubular member, said resilient, enclosed member being generally cylindrical in configuration, having substantially parallel side walls, the diameter of said resilient, enclosed member being less than the diameter of said tubular member, such that said resilient, enclosed member is normally not in tight contact with the inner surface of said tubular member, said resilient, enclosed member being air-impervious and collapsible, increasing in diameter and decreasing in width when dispensing pressure from a dispensing gun plunger is applied thereto for selectively placing said resilient, enclosed member in tight contact with the inner surface of said tubular member, and advancing the viscous material through said tubular member and out said dispensing opening, said resilient, enclosed member reverting to its original configuration and normal state of not being in tight contact with the inner surface of said tubular member when the pressure from the plunger is released, whereby pressure forces accumulated in the viscous material act on the resilient, enclosed member to displace it away from the dispensing opening rather than advancing the viscous material through said dispensing opening.

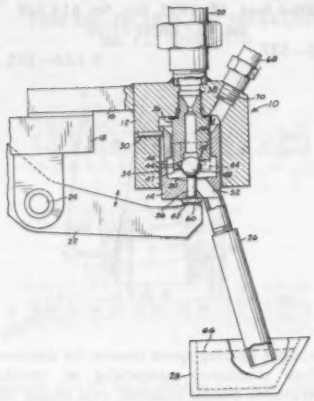
8. A floating member for use in dispensing a viscous material from a cartridge, said cartridge including an elongated tubular member having a cylindrical inner surface, said tubular member further having at one end a fixed wall having a dispensing opening therethrough, said floating member comprising a resilient, enclosed, hollow member generally cylindrical in configuration, having substantially parallel side walls, said floating member being slidably receivable in said tubular member, said floating member having a diameter less than that of said tubular member such that said floating member is normally not in tight contact with the inner surface of said tubular member when received therein, said energy dissipating member further being air-impervious and collapsible, increasing in diameter and decreasing in width when one of said side walls is placed against the viscous material in the cartridge and the other side wall is subjected to a dispensing force such that the floating member is disposed in tight contact with the inner surface of said tubular member for advancing the viscous material through the cartridge and out the dispensing opening, said floating member reverting to its original configuration and normal state of not being in tight contact with the inner surface of said tubular member when the force is released whereby pressure forces accumulated in the viscous material act on the floating member to displace it away from the dispensing opening rather than advancing the viscous material through said dispensing opening.

4,022,356

METAL VALVE FOR BATTERY GRID CASTING MACHINE

Jack E. McLane, Port Huron, Mich., assignor to Wirtz Manufacturing Company, Inc., Port Huron, Mich.

Filed July 21, 1976, Ser. No. 707,300
Int. Cl.[2] B67D *5/06*
U.S. Cl. 222—509 11 Claims



1. A valve for dispensing molten metal to a mold filling ladle of a battery grid casting machine comprising upper and lower tubular housings having their central axes extending generally vertically in generally coaxially aligned relation, the lower end of said upper housing and the upper end of said lower housing being in open communication with one another and telescopically engaged, one of said housings being supported in fixed position on the machine and the other being mounted on the machine for vertical movement through a predetermined stroke, means for shifting said movable housing vertically, said upper housing having a bore therein which opens vertically downwardly, said bore terminating at its lower end in an annular valve seat which is generally coaxial with said upper housing, said valve seat being disposed below said upper end of said lower housing, an inlet conduit for molten metal connected with said bore, said lower housing having an upstanding pedestal therein, said pedestal having an upstanding pedestal therein, said pedestal having a generally flat upper end face lying in the plane perendicular to the axis of said housing, a spherical ball resting on said upper face of said pedestal, said upper housing having a plurality of at least three circumferentially spaced fingers extending downwardly beyond said annular valve seat, the radially innermost end face portions of said fingers defining a circle accurately concentric with said annular valve seat, said fingers extending downwardly so that the lower end portions thereof extend circumferentially around and radially confine the ball valve member, the circle defined by the innermost end face portions of said fingers having a diameter slightly larger than the diameter of the ball valve member move relatively toward each other the ball valve member readily aligns itself with the valve seat regardless of the misalignment between the two housings, means forming a

molten metal outlet in said lower housing at a level below said pedestal whereby, when the movable housing is shifted vertically to unseat the ball, the molten metal flows downwardly by gravity through said outlet means.

9. A valve as called for in claim 1 wherein the upper housing is fixed on the machine and the lower housing is vertically movable, said means for shifting the lower housing vertically comprising a lever pivoted on a horizontal axis, said lever having a free end underlying and supporting the lower housing, the free end of said lever being rounded and frictionally engaging the bottom face of the lower housing.

4,022,357

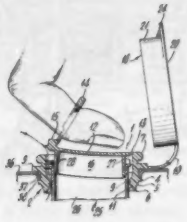
RETRACTABLE POURING SPOUT CLOSURE

Davis B. Dwinell, Warren, N.J., assignor to American Flange & Manufacturing Co., Inc., Linden, N.J.

Filed Sept. 18, 1975, Ser. No. 614,545

Int. Cl.² B65D *47/10*

U.S. Cl. 222—537 **3 Claims**



1. A retractable pouring spout closure for dispensing liquid products from containers comprising an annular nozzle molded of synthetic plastic material, said nozzle defining an axial dispensing throat having a zone of reduced internal diameter, an integrally formed sealing diaphragm closing off said throat, a retractable pouring spout having a circumferential lip at its upper end, said upper end being housed within said nozzle throat in stored position with said circumferential lip radially spaced from said throat and forming an axial passage between said spout and said reduced diameter zone and means formed on the undersurface of said sealing diaphragm for closing off the uppermost end of said spout whereby initial dispensing from the container requires breaking of said diaphragm seal prior to opening said spout upper end by axial withdrawal of said closing means with said spout in stored position.

4,022,358

VESSELS FOR CONTAINING MOLTEN METAL

John Henry Courtenay, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

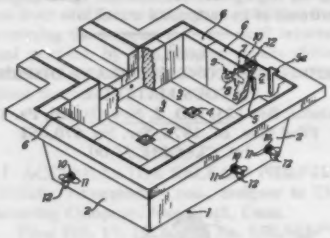
Filed July 9, 1975, Ser. No. 594,552

Claims priority, application United Kingdom, July 11, 1974, 30804/74; June 10, 1975, 24869/75

Int. Cl.² B22D *41/02*

U.S. Cl. 222—607 **10 Claims**

1. A vessel for containing molten metal comprising a metal base wall and at least one side wall, at least one slab of refractory material lining the base wall, and a plurality of slabs of refractory material lining the side wall, fixing members passing through a wall and engaging at least one of said slabs so as to fix said slab in place, said fixing members permitting the slab fixed thereby to be removed from the vessel independently from the other slabs for repair, and an inner expendable lining of refractory heat-insulating material on said slabs for contact



with the molten metal to protect said slabs from wear caused by said metal.

4,022,359

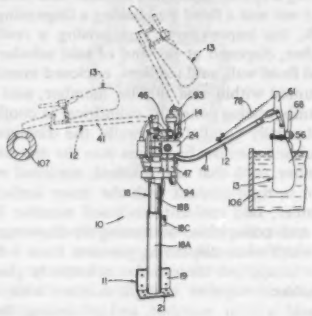
LADLING APPARATUS

Glen R. Smidt, R.R. No. 1, Bangor, Mich. 49013

Filed Dec. 18, 1975, Ser. No. 641,899

Int. Cl.² B22D *41/04*

U.S. Cl. 222—629 **8 Claims**



1. A ladling apparatus for picking up and transferring a preselected amount of a flowable fluid material, comprising:

a frame means;

transfer arm means mounted on said frame means for swinging movement within a substantially vertical plane between filling and pouring positions, said transfer arm means projecting outwardly from one side of said frame means when in said filling position and projecting outwardly from the other side of said frame means when in said pouring position;

drive means interconnected to said transfer arm means for causing swinging movement of said arm means between said filling and pouring positions;

a ladle assembly mounted on said arm means adjacent the free end thereof, said ladle assembly including a bowllike ladle member defining an upwardly opening chamber therein of predetermined volume when said ladle member is in an upright position;

hinge means connecting said ladle member to said transfer arm means for permitting relative swinging movement between said ladle member and said arm means, said hinge means permitting said ladle member to be maintained in a suspended upright position when said arm means is in said filling position, said hinge means also maintaining said ladle member in an upright suspended position as said arm means is swingably moved away from said filling position into an intermediate position which is

located between said filling and pouring positions but is substantially spaced from said filling position; and

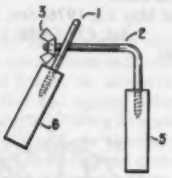
stop means coacting between said arm means and said ladle assembly as said arm means is swingably moved from said intermediate position toward said pouring position for causing said ladle member to be tilted into a pouring orientation as said arm means approaches said pouring position.

4,022,360

ADJUSTABLE LOCKING DEVICE FOR PANTS HANGERS AND SKIRT HANGERS

Frederic C. Lucas, Jr, 4250 Middlesex Drive, San Diego, Calif. 92116

Filed Mar. 29, 1976, Ser. No. 671,500
Int. Cl.² A47J 51/14
U.S. Cl. 223—96 1 Claim



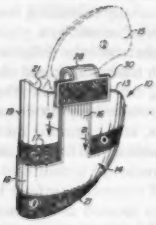
1. An adjustable locking device for clamping a pair of wooden gripping members of a conventional clamping hinged pants hanger comprising: a first metal rod having two arms disposed at 90° to each other with the ends thereof threaded, one arm being secured in the top surface of one end of one of said gripping members and the other arm threadably carrying a wing nut and extending across the end of the other of said gripping members, a second metal rod having a threaded end secured in the top surface of the other of said gripping members, the other end of said second metal rod formed into an inverted U providing a vertically elongated opening receiving the other arm of said first metal rod, said wing nut bearing about the opening releasably clamping said pair of gripping members together.

4,022,361

HOLSTER FOR A CONCEALED WEAPON

Daniel H. Devlin, 17635 N. 42nd St., Phoenix, Ariz. 85032

Filed Apr. 5, 1976, Ser. No. 673,962
Int. Cl.² F41C 33/02
U.S. Cl. 224—2 B 5 Claims



1. A holster for supporting a handgun in a concealed position inside the trouser waistband of a wearer and suspended from the belt of the wearer at first fastener means at the inner side of said belt, said holster comprising:

a. a holster case defining a pistol receiving compartment, said holster case having first and second opposite sides; and

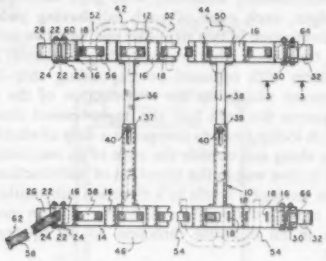
b. an elongate supporting strap having opposite upper and lower ends, said strap extending along the exterior of the first side of said holster case and secured to said holster case at said first side at a location near the lower end of the strap, the upper end of said strap being reversely bent forming a bight and a mounting tab, the outer surface of said mounting tab having second fastening means associated therewith cooperable with said first fastening means whereby the holster case can be positioned within the trousers of the wearer with said tab interposed between the belt and trousers with said first and said second fastening means detachably engaged, said tab is substantially concealed from view between the belt and trousers and whereby said strap and the outer side of said holster can be partially separated so the wearer's shirt can be inserted therebetween to conceal the holster.

4,022,362

BICYCLE CARRIER

Jess G. Revercomb, 6890 Old Porter Road, Portage, Ind. 46368

Filed Dec. 18, 1975, Ser. No. 642,011
Int. Cl.² B60R 9/10
U.S. Cl. 224—42.1 F 6 Claims



1. A bicycle carrier for a vehicle top comprising:

a first and second support member;

a brace member connecting said first and second support members;

brackets provided at the ends of said first and second support members, said brackets having means for connection to said vehicle top;

a plurality of upstanding ribs provided on each of said first and second support members regularly spaced the lengths thereof;

said ribs on said first and second support members are laterally spaced to receive therebetween an inverted seat of a bicycle;

each of said first and second support members having a plurality of slotted openings therein between said ribs on said support members;

a buckle provided on each of said first and second support members at one end thereof; and

a belt anchored at an end of each of said first and second support members, the other end of said belt being insertable through said slots in said support members and through said buckle for tightening therethrough.

4,022,363

DEVICE FOR CARRYING AND STORING BOTTLES

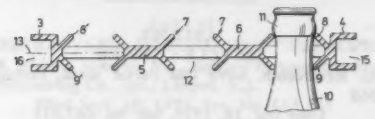
Gunnar Thure Eliassen, Stenbocksgatan 13, S-661 00 Saffle, Sweden

Filed Sept. 10, 1975, Ser. No. 611,936
Claims priority, application Sweden, Sept. 11, 1974, 7411458; Aug. 21, 1975, 7509323
Int. Cl.² B65D 71/00
U.S. Cl. 224—45 AA 9 Claims

1. In a device for carrying and storing bottles having a plurality of rails arranged side by side on a holder between

their opposing edges forming substantially uniformly wide gaps, said edges having yielding edge portions forming locking means which, on the introduction of the neck of a bottle, squeeze the neck fast, the improvement characterized in that said locking means comprises a strip of elastic material extending along and outside the edge of an associated rail and arranged to give way in the direction of introduction on introducing the neck of a bottle in a direction substantially at right angles to a plane defined by said holder, and on movement of the neck in an opposite direction to be squeezed tightly against it, and each strip mounted on the side of the respective rail facing away from the gap and has a bead lying outside and parallel with the edge of the rail facing the gap.

5. In a device for carrying and storing bottles having a



plurality of rails arranged side by side on a holder, said rails forming substantially uniformly wide gaps between their opposing edges, each edge of each rail having yielding edge protions comprised of two strip-like lips, said two strip like lips diverging from each other and extending outwardly from their rails to form with opposed corresponding strip-like lips a locking means which, on the introduction of the neck of a bottle, squeeze the neck fast, the improvement characterized in that each locking means comprises a strip of elastic material extending along and outside the edge of an associated rail and arranged to give way in the direction of introduction on introducing the neck of a bottle in a direction substantially at right angles to a plane defined by said holder, and on movement of the neck in an opposite direction to be squeezed tightly against it.

4,022,364

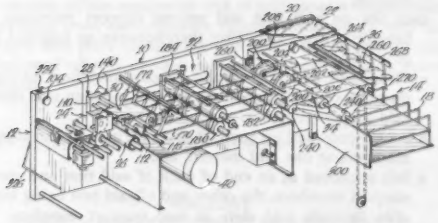
BURSTER

Charles C. Davis, Elgin, Ill., assignor to UARCO Incorporated, Barrington, Ill.

Division of Ser. No. 506,190, Sept. 16, 1974. This application Feb. 26, 1976, Ser. No. 661,546

Int. Cl.² B26F *3/02*

U.S. Cl. 225—100 **3 Claims**



3. A burster for continuous forms stationery comprising the combination of: means defining a path of stationery travel having an infeed end and an outfeed end; two pairs of bursting rolls located along said path, at least one roll in each of said pairs being driven, the driven roll in the pair nearest the infeed end of said stationery path being driven at a lesser rate of peripheral speed than the driven roll in the other pair; means mounting one of said pairs of bursting rolls for movement relative to the other along said path of stationery travel to accommodate adjustment of said bursting rolls to burst forms having differing individual form lengths; conveying means located between said outfeed and said bursting rolls including nip defining means for receiving individual form lengths of stationery and conveying the same to said outfeed end, said nip defining means being mounted for movement relative to said other pair of bursting rolls for adjustment to accommodate receipt and conveying of individual form lengths of different sizes; reversible motor means for simultaneously moving one pair of bursting rolls and said nip defining means along said path of stationery travel; and selectively operable control means for said motor means.

4,022,365

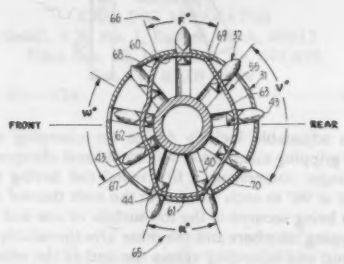
PIN FEED PLATEN FOR DOCUMENT TRANSPORT MECHANISM

Ronald G. Weller, Fremont, Calif., assignor to Qume Corporation, Hayward, Calif.

Filed May 13, 1976, Ser. No. 685,960

Int. Cl.² G03B *1/24*

U.S. Cl. 226—81 **14 Claims**



1. A document transport mechanism for transporting flexible material having longitudinally spaced perforations past a work station having a forward direction material exit location and a reverse direction material exit location, said document transport mechanism comprising:

stationary mounting means;

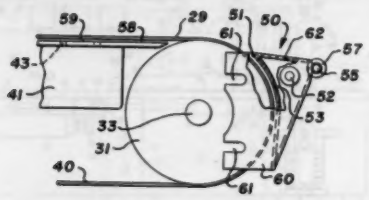
a platen mounted to said stationary mounting means for rotation in said forward and said reverse directions about an axis; and

feed pin assembly means for providing a pulling force for said material alternately at said forward and said reverse material exit locations when said platen is rotated in said forward and said reverse directions, respectively, said feed pin assembly means including housing means mounted to said platen for rotation therewith and having a plurality of radially extending feed pin bores distributed about said axis of rotation, a plurality of feed pins each translatably received in a different one of said feed pin bores and each having an inner end, a tapered outer end, and a camming slot located therebetween; and a camming member non-rotationally mounted with respect to said housing means, said camming member having a substantially rigid camming surface arranged about said axis of rotation and recieved within said camming slots of said feed pins, said camming surface having first and second camming lobes located at first and second angular positions about said axis corresponding to said forward and said reverse direction material exit locations, respectively, for translating said feed pins radially outwardly of said feed pin bores to a maximal extended position, an intermediate camming portion located at a third position corresponding to said work station for translating said feed pins radially inwardly of said feed pin bores to a fully retracted position, and a remaining camming portion located generally opposite said third angular position for translating said feed pins to a partially extended position in which said outer ends are visible to an operator.

4,022,366
SHEET HANDLING APPARATUS

Sidney C. Rooney, Vancouver, Canada, assignor to Durad Machine Company Ltd., New Westminster, Canada

Filed Mar. 22, 1976, Ser. No. 669,344
Int. Cl.² G03B *1/56*
U.S. Cl. 226—91 8 Claims



1. In an apparatus to transporting a sheet of dry paper between two structures spaced from each other, the apparatus including an elongated frame, an air-pervious endless belt movably mounted on first and second pulleys positioned at each end of the frame, the belt having its upper rung travelling from the first pulley, adjacent one structure, to the second pulley, adjacent the other structure, and arranged to receive a lead strip of the sheet from the one structure, a vacuum chest having a perforated top extending longitudinally of and below the upper rung of the belt, means for evacuating air from the chest in order to apply a vacuum at the undersurface of the belt and thereby cause the lead strip to cling to the belt, the improvement comprising:

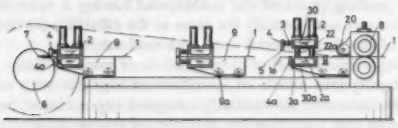
a nose shoe disposed beyond the second pulley and spaced slightly from the second pulley to define an opening between the shoe and the second pulley where the sheet leaves the belt, an inlet into the shoe to receive a supply of air, at least one first air jet means disposed in the nose shoe adjacent the second pulley whereby a first air jet may be directed into the opening and against the sheet in a direction contrary to the rotation of the second pulley sufficient both to overcome any gripping effect of air entrained within the air-pervious belt and to lift the sheet of flexible material; and

second air jet means attached to the nose shoe on that side of the shoe remote from the second pulley, and able to direct air downstream of the shoe to act as a platform for the sheet.

4,022,367
DEVICE FOR CONVEYING METAL SHEETS FOR AFFIXATION TO A WINDUP DRUM FOR WINDING THEREON

Willi Sporenberg, Hemer, and Herbert Klockenhoff, Menden, both of Germany, assignors to Sundwiger Eisenhutte Maschinenfabrik Grah & Co., Germany

Filed Aug. 2, 1976, Ser. No. 710,721
Claims priority, application Germany, Feb. 7, 1976, 2604909
Int. Cl.² B65H *19/28*
U.S. Cl. 226—91 5 Claims

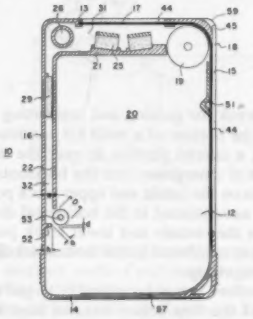


1. A device for conveying the leading edges of metal strips and sheets to a fixation point on a reel drum for winding of the metal on the drum, comprising a carriage movable in directions toward and away from the drum, clamping means on said carriage for clamping the sheet adjacent to but spaced from its leading edge for moving it into association with the drum, and sheet end positioning means on said carriage engageable with the leading edge of the sheet outwardly of said clamping means for positioning the leading edge into alignment with the fixation point on the drum and including first and second limitation members engageable with respective opposite sides of said sheet and mounting means on said carriage mounting said limitation members for separate independent movement toward and away from said clamping means and toward and away from the respective sides of said sheet whereby to permit engagement of said sheet and movement of the edge thereof to align it with the fixation point on the reel drum.

4,022,368
TAPE CARTRIDGE HAVING ENHANCED TAPE DRIVE FACILITIES

Takao Ando, Ebina; Hiroshi Fujikura, Fujisawa; Norishige Suzuki, Tokyo, and Akira Watanabe, Yokohama, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,397
Claims priority, application Japan, Aug. 29, 1975, 50-104074
Int. Cl.² B65H *17/42*
U.S. Cl. 226—118 7 Claims



1. A tape cartridge comprising a hollow container having a tape receiving cavity for storing an elongated tape therein, a peripheral wall having a front wall portion joined by first and second parallel side wall portions further joined by a rear wall portion, tape being adapted to move from said cavity along said second wall portion, thence along said front wall portion, an internal wall extending in spaced relationship to said second side wall of said hollow container to define a narrow elongated tape passageway therebetween, one end of said tape passageway facing said rear wall portion opening to said tape receiving cavity in a predetermined spacing from said rear wall portion, and tape guide means for guiding said tape from said narrow longitudinal elongated tape passageway to said tape receiving cavity;

characterized in that:

protrusion means extend inwardly from said second side wall portion adjacent said one end of longitudinal tape passageway and being intermediate said rear wall portion and said one end; and

a guide roller rotatably mounted adjacent to and intermediate said one end and said protrusion means to define a narrow entry area to said tape passageway between said protrusion means and periphery of said guide roller not extending closer to said rear wall portion than said protrusion means nor closer to said second side wall portion than said internal wall is spaced from said second wall, whereby said protrusion means and said guide roller cooperate to prevent the tape from creasing and undue

drag from being applied to the tape at the entry to said tape passageway from tape cavity.

4,022,369

CURVED ROLLER TRACK FOR CONTINUOUSLY CAST INGOTS

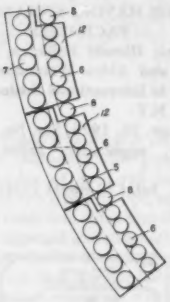
Klaus Wünnenberg, Duisburg, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Jan. 21, 1976, Ser. No. 651,188

Claims priority, application Germany, Jan. 31, 1975, 2504558

Int. Cl.² B65H *17/20;* **B65G** *13/02;* **B22D** *11/12*

U.S. Cl. 226—189 **6 Claims**



1. In a roller track for guiding and supporting an ingot as withdrawn from the bottom of a mold for continuous casting, the track having a curved portion to veer the ingot from a vertical direction of emergence into the horizontal, the track having first rollers on the inside and upper track portion of the curved path and as continued in the horizontal direction, and second rollers on the outside and lower track portion of the curved path and as continued in the horizontal direction, the improvement comprising:

The second rollers being consistently larger in diameter than some of the first rollers over at least a significant portion of said curved track path; and there being more first rollers than second rollers in said significant portion, so that the spacing between the first rollers is smaller than the spacing between the second rollers in addition to the difference in path length on account of curvature.

4,022,370

DUAL IN-LINE CHIP EXTRACTOR-EXCHANGER APPARATUS

David John Durney, Holland, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 30, 1976, Ser. No. 682,098

Int. Cl.² B23K *1/20;* **H05K** *3/34*

U.S. Cl. 228—5.1 **10 Claims**

1. Apparatus for removing and replacing dual in-line solid state chips and like devices relative to printed wiring assemblies such as printed circuit boards, comprising:

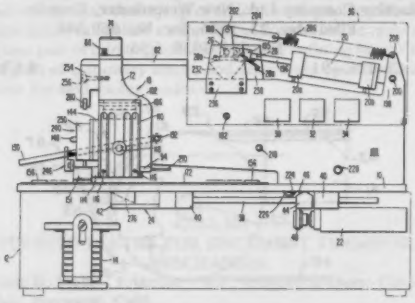
a first heat source, said first heat source comprising oppositely disposed heater elements, means to position said elements so that said elements straddle an individual chip effective when said heater elements are activated to release said chip from said board;

a second heater source adjacent said first heat souce;

means to position a printed circuit board between said first and second heat sources;

means for energizing said first and second heat sources effective to release the attachment means securing said chips to said board; and

cyclically operable means operably associated with said means to position the printed circuit board for detaching



and removing a chip from said board upon release of the attachment means.

4,022,371

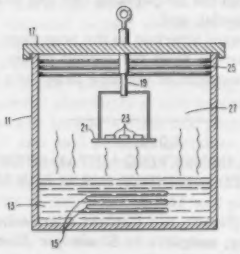
VAPOR BONDING METHOD

Eugene Roman Skarvinko, Binghamton, and William Ditlef von Voss, Endicott, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 14, 1976, Ser. No. 695,482

Int. Cl.² B23K *1/04*

U.S. Cl. 228—223 **13 Claims**



1. A method for simultaneously soldering, fluxing and cleaning an article of manufacture, comprising the steps of:

bringing a heat transfer medium to a boil in an enclosure to generate a substantially saturated vapor atmosphere, the heat transfer medium having a boiling point greater than the melting point of the solder, and having a solubility parameter substantially the same as the solubility parameter of the flux material used with said solder;

applying solder and flux to said article of manufacture;

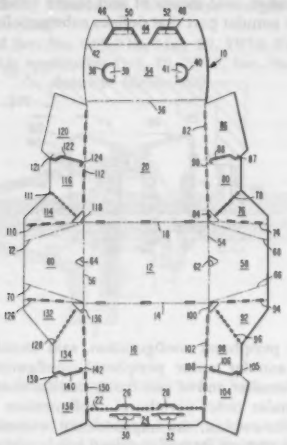
introducing said article of manufacture together with said solder into said substantially saturated vapor atmosphere to effect the flow of said solder on said article of manufacture and simultaneously effect the dissolving of any excess flux from said article of manufacture by said vapor; and

removing said article of manufacture from said vapor atmosphere.

4,022,372
ARTICLE CARRIER

Earl J. Graser, Monroe, La., assignor to Olinkraft, Inc., West Monroe, La.

Filed Aug. 5, 1976, Ser. No. 711,887
Int. Cl.² B65D 5/02, 75/08
U.S. Cl. 229—40 16 Claims



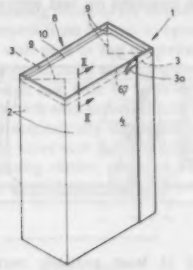
1. A wrap-around article carrier comprising
a bottom panel with two sides,
first and second side panels extending upward from opposite sides of the bottom panel,
a top panel extending across the top of the carrier and integral with the first side panel,
carrying means provided in the top panel for carrying the carrier,
a first lock panel extending from an edge of the top panel,
a second lock panel extending from the second side panel,
the first and second lock panels being locked together to secure the carrier around the articles,
end retaining flaps extending from the ends of the bottom panel, and
tuck flaps connecting the end retaining flaps to the side panels, the tuck flaps being folded and held between the articles in the carrier and the side panels to hold the end retaining flaps in a vertical position.

4,022,373
PACKAGE WITH REINFORCING INSERT

Rolf Köhnlein, Nagold; Klaus Domke, Ditzingen; Walter Bandle, Rommelshausen, and Helmut Schottle, Freiberg (Neckar), all of Germany, assignors to Fr. Hesser Maschinenfabrik AG, Stuttgart, Germany

Filed Dec. 15, 1975, Ser. No. 640,474
Claims priority, application Germany, Dec. 14, 1974, 7441619[U]
Int. Cl.² B65D 5/54, 65/32, 65/34
U.S. Cl. 229—51 AS 5 Claims

1. A package comprising in combination:
a closed outer sleeve of generally bag-like configuration;
a generally tubular reinforcing member extending within at least the upper region of said outer sleeve, said reinforcing member being at least regionally secured to said sleeve;
a flat tear strip interposed between said outer sleeve and said tubular reinforcing member and detachably attached to the reinforcing member and connected to said outer sleeve,
the strip and the tubular reinforcing member defining a

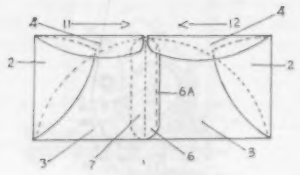


common end arranged substantially flush with respect to each other.

4,022,374
ADJUSTABLE ENVELOPE

John L. Conn, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed July 1, 1975, Ser. No. 592,186
Int. Cl.² B65D 27/00
U.S. Cl. 229—68 R 1 Claim



1. An adjustable envelope assembly comprising two complementary sections, each of said sections having a four-sided flat base surface with bottom, top and first end flaps attached on three sides thereto, said top flaps each having seals along their entire periphery, said end and bottom flaps having seals along only part of their respective peripheries, one of said sections having a sealing end attached to said bottom flap, the other of said sections having an end sealing flap attached to the base flap along its fourth side, each of said sections individually sealable and capable of use as complete envelopes, said bottom and first end flaps of each of said sections folded over said base surface and sealed to each other, one of said sections telescopically engaged within the other of said sections, along said fourth side, said two sections attached by said sealing end.

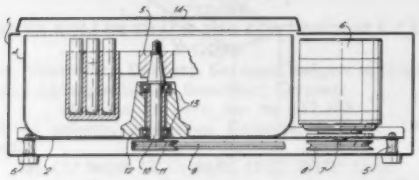
4,022,375
CENTRIFUGE

Osmo Antero Suovaniemi, and Jukka Topias Tervamäki, both of Helsinki, Finland, assignors to Osmo Antero Suovaniemi, Helsinki, Finland

Filed Feb. 4, 1976, Ser. No. 655,053
Claims priority, application Finland, Feb. 14, 1975, 750424
Int. Cl.² B04B 7/02
U.S. Cl. 233—1 R 1 Claim

1. A laboratory centrifuge comprising a housing having an interior bottom surface, a cover hinged to said housing, a support plate having an upper and a lower surface, a plurality of elastic elements attached between said lower surface of said support plate and said interior bottom surface of said housing to elastically support said plate, an electric motor mounted on said upper surface of said support plate, a bearing box and bearings mounted on said upper surface of said support plate,

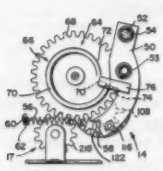
a shaft held by said bearings, a rotor mounted on said shaft, means for driving said rotor from said electric motor, and a protective hood mounted on said upper surface of said support plate and at least partially surrounding said rotor, whereby said motor, rotor and hood are rigidly connected to said upper surface of said support plate for movement therewith as a unit relative to said housing.



4,022,376
DIGITAL DISPLAY MECHANISM

Richard H. Weber, Indianapolis, Ind., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Division of Ser. No. 449,696, March 11, 1974, Pat. No. 3,922,848. This application Sept. 17, 1975, Ser. No. 614,105
Int. Cl.² G06C 7/10
U.S. Cl. 235—134 **4 Claims**



1. In a display mechanism of the type wherein rotatable display means carry indicia on their periphery, the improvement comprising providing:

a. a first rotatable display means having at least one window in its periphery and indicia spaced about said periphery,

b. a second rotatable display means rotatable within said first rotatable display means and having indicia spaced about its outer periphery to be individually exposed to said window, and

c. intermittent advance means whereby at least one of said first and second rotatable display means is incrementally advanced comprising:

1. a cam member having a ramped surface ramped in a direction of said cam member's axis of rotation and a ramped surface ramped radially from said axis,

2. a drive lever responsive to said ramped surfaces, and

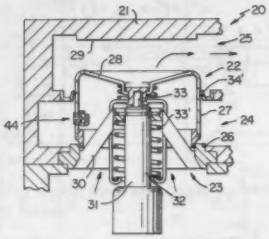
3. actuator means responsive to said drive lever and coupled to said one rotatable display means.

4,022,377
THERMOSTATICALLY OPERATED SLEEVE VALVE CONSTRUCTION

Joseph P. Wagner, Knoxville, and Boyd P. Sliger, Concord, both of Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Feb. 20, 1975, Ser. No. 551,346
Int. Cl.² F01P 7/02
U.S. Cl. 236—34.5 **1 Claim**

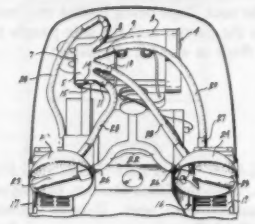
1. In a thermostatically operated valve construction having a tubular sleeve valve member for opening and closing an annular valve seat of the construction at one end of said tubular sleeve valve member and a temperature responsive device interconnected to said sleeve valve member for moving said sleeve valve member relative to said valve seat in relation to sensed temperature, said sleeve valve member having means projecting from said one end thereof into and closely adjacent said annular valve seat when said sleeve valve member is between a closed position and a partially open position to thereby meter the flow through said valve seat during a substantial portion of the initial opening movement of said sleeve valve member, said means of said sleeve valve member comprising an annular part that defines substantially a frusto-conical outer peripheral configuration, said annular part having another annular outer peripheral configuration extending from the smaller end of said frusto-conical configuration, said other annular outer peripheral configuration being substantially frusto-conical, the improvement wherein said annular part has a portion thereof disposed inside said one end of said sleeve valve member and has an outwardly directed transverse annular flange abutting said one end of said sleeve valve member.



4,022,378
HEAT DISTRIBUTION SYSTEM FOR SNOWMOBILE

Gilbert Essiembre, 958 Sauve Blvd., St. Eustache, Quebec, Canada

Filed Mar. 4, 1976, Ser. No. 663,806
Claims priority, application United Kingdom, June 9, 1975, 24584/75
Int. Cl.² B60H 1/02
U.S. Cl. 237—12.3 A **4 Claims**



1. A snowmobile comprising an air-cooled engine, a cowl secured to and forming a cooling air passage against the engine, a heated air manifold connected to the engine cowl, heated air outlets being adapted to be positioned adjacent body portions respectively of a driver operating the snowmobile, heated air conduits leading from the heated air manifold to the heated air outlets respectively, a pair of steering handles, a pair of foot rests, and said heated air outlets being positioned at the steering handles and foot-rests respectively, thereby being adapted for supplying heated air at the hands and feet constituting said body portions of the driver, said heated air manifold having a deflector member adjustably mounted in said manifold and adjustably operatively positioned in the path of the heated air issuing from said cooling air passage and deflecting heated air into said manifold, and a

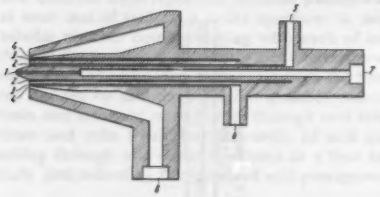
hand control is connected to said deflector member for adjustment of the transverse insertion thereof into said path to adjustably vary the supply of heated air at said body portions.

4,022,379

PROCESS FOR REACTING ACID AND BASE

Gerhard Ladisch, Constance, Germany, assignor to Otto Pfrengle, Germany

Division of Ser. No. 468,910, May 10, 1974, Pat. No. 3,929,291. This application Oct. 16, 1975, Ser. No. 622,965
Int. Cl.² B05B 7/00
U.S. Cl. 239—8 5 Claims



1. A process for reacting an acid and a base, which comprises:

passing pressurized gas through a central channel of a spray mixing nozzle to the outlet orifice of the nozzle;

passing to the outlet orifice of the nozzle liquid acid through one and liquid base through a second of at least two annular channels which surround the central channel; and

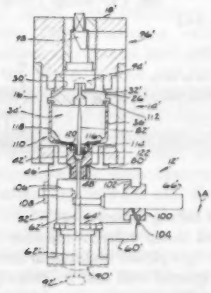
passing pressurized gas through an outer annular channel which surrounds the at least two annular channels to the outlet orifice of the nozzle, said pressurized gas from the central channel and the outer annular channel forcefully mixing the acid and base from the at least two annular channels in a spray at the nozzle outlet at a throughput capacity in excess of 150 to 200 liters per hour whereby the acid and base react in said spray to produce a salt.

4,022,380

FLUID FLOW CONTROL VALVE

Edgar Peter Scragg, 60 Mulder St., Florida Park Extension 3, Florida, Transvaal, South Africa

Filed May 6, 1974, Ser. No. 466,934
Claims priority, application South Africa, May 11, 1973, 73/3210; June 4, 1973, 73/3746
Int. Cl.² F16K 21/06
U.S. Cl. 239—68 6 Claims



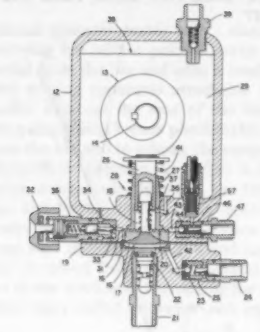
1. A shower valve comprising a casing having an inlet and an outlet, a shower rose at the outlet, a chamber having a movable wall part, a restricted inlet to the chamber, said restricted inlet communicating with the inlet to the casing, an outlet from the chamber, a valve seat and co-operating valve closure element for normally closing said outlet from the chamber, a valve actuating element for sequentially displacing the valve closure element from its seat to open said outlet and urging the movable wall part in the direction which reduces the volume of said chamber, said actuating element projecting from the casing through said rose to form an accessible push button by means of which said valve closure element and the movable wall can be sequentially displaced, and a valve surface and co-operating valve seat for controlling flow from the casing inlet to the casing outlet, the seat and surface being arranged to separate as said movable wall part moves in said direction.

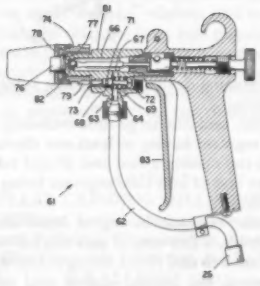
4,022,381

AIRLESS SPRAY APPARATUS

Rudolf R. Karliner, 10145 Lloy Ave., Portage, Mich. 49081

Filed Nov. 24, 1975, Ser. No. 634,458
Int. Cl.² B05B 9/00
U.S. Cl. 239—126 11 Claims





1. In a diaphragm pump having a pumping fluid chamber and a driven fluid chamber, a diaphragm separating the chambers, inlet and outlet passages to the driven fluid chamber, and drive means for alternately pressure loading and unloading pumping fluid in the pumping fluid chamber, the improvement which comprises:

first valve means responsive to the pumping fluid chamber pressure for varying driven fluid pressure in communication with the outlet passage of the driven fluid chamber.

11. A spray gun apparatus comprising:

a spray gun body;

means for coupling pressurized fluid to a spray chamber and

an auxiliary chamber in communication with the spraying chamber in the spray gun body;

nozzle means for selectively dispersing fluid from the spray chamber;

a cover member, threadedly received on a nozzle end of the spray gun body, including a plurality of circumferentially arrayed recesses;

a plunger member, slideably received within an end of said auxiliary chamber, having a rear portion acted upon by the pressure in the auxiliary chamber and having a front pin portion operable to be received within one of said recesses when the auxiliary chamber is pressurized moving the plunger to an end of the auxiliary chamber; and

return means for moving the plunger from the end of the chamber and retracting the pin portion from said recess when the auxiliary and spraying chambers are depressurized.

4,022,382

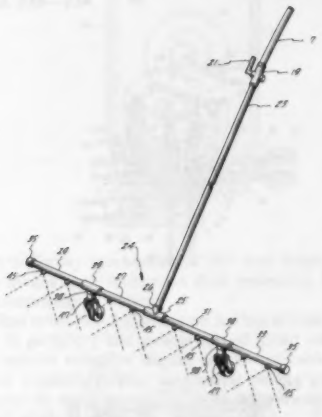
SURFACE CLEANING DEVICE

Arnold Bernard Engdahl, Jr., 15282 Moulins Circle, Irvine, Calif. 92714

Filed Apr. 21, 1976, Ser. No. 679,051

Int. Cl.² B05B *1/20, 15/06;* **B08B** *3/02*

U.S. Cl. 239—287 **9 Claims**



1. A surface cleaning device for cleaning substantially flat surfaces, comprising:

a discharge tube, said discharge tube including:

a first tube segment having at least one discharge nozzle therein, a cap closing a first end of said tube segment, the second end of said tube segment being fastened to a first T fitting;

a second tube segment having at least one discharge nozzle therein, a first end of said second tube segment being fastened to said first T fitting in line with said first tube segment, the second end of said tube segment being fastened to a second T fitting;

a third tube segment having at least one discharge nozzle therein, a first end of said first tube segment being fastened to said second T fitting, in line with said second tube segment, the second end of said third tube segment being fastened to a third T fitting;

a fourth tube segment having at least one discharge nozzle therein, a first end of said fourth tube segment being fastened to said third T fitting, in line with said third tube segment, a cap closing the second end of said fourth tube segment;

an inlet tube connected to said second T fitting, said inlet tube having a coupling means attached thereto for connection to a water hose; and

a pair of caster-type wheels, one connected to said first T fitting, the other connected to said third T fitting.

4,022,383

NOZZLE FOR WELDING, HEATING, CUTTING AND/OR FLAME CLEANING

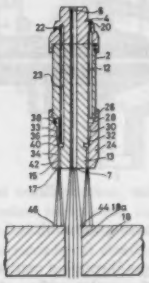
Juan A. Zeley, Avenida Principal Colinas, Apartado Postal 60061, Caracas, Venezuela

Filed Nov. 3, 1975, Ser. No. 627,922

Claims priority, application Germany, Nov. 2, 1974, 2452004

Int. Cl.² B05B *7/00*

U.S. Cl. 239—419.3 **8 Claims**



1. A nozzle for welding, heating, cutting, flame cleaning and the like comprising a shank having a substantially central oxygen duct extending axially therethrough to terminate in an outlet opening, a heating gas duct and a heating oxygen duct formed in said shank and extending through said shank substantially parallel thereto, one of said ducts being of a shorter axial length than the other and opening into an annular chamber formed in said nozzle intermediate its ends, a second annular chamber formed in said nozzle at a point spaced from the end of said shorter duct and the other of said ducts opening to said second annular chamber, a first annular passage connecting said first annular chamber and said second annular chamber and a second annular passage connected with said second annular chamber and extending to the end of said nozzle to form an annular outlet disposed around said oxygen outlet opening.

4,022,384

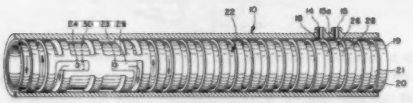
IRRIGATION TUBING

Wallis I. Hoyle, and John D. Schmunk, both of Findlay, Ohio, assignors to Hancor, Inc., Findlay, Ohio

Filed Dec. 8, 1975, Ser. No. 638,964

Int. Cl.² B05B *15/00*

U.S. Cl. 239—542 **17 Claims**



1. Irrigation tubing comprising:

an elongated outer tubular member constructed from a relatively rigid plastic material to have a generally smooth inner peripheral wall and an outer peripheral wall, said outer member including spaced apart fluid outlet apertures communicating between said inner and outer peripheral walls; and,

an elongated inner tubular member constructed from a relatively rigid plastic material and coaxially disposed within said outer member, said inner member having an

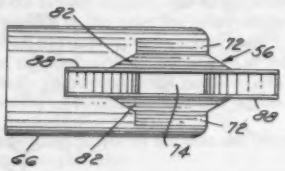
inner peripheral surface defining a fluid flow channel and an outer peripheral surface, a repetitive pattern of tortuous conduits having at least some sharp reversing bends therein included in the outer peripheral surface of said inner tubular member, said conduits each having first and second ends and defining crest areas at said outer peripheral surface and root areas spaced inwardly from said outer toward said inner peripheral surface, said inner member further including at least one fluid inlet aperture communicating between said fluid flow channel and each one of said conduits adjacent one end thereof, said inner member being dimensioned such that the crest areas at said outer peripheral surface closely engage the inner peripheral wall of said outer tubular member such that said conduits form repetitive tortuous passageways with at least one of said fluid outlet apertures in said outer tubular member communicating with each of said conduits at the position spaced from said one end toward the other end, whereby fluid passing through the flow channel defined by said inner tubular member passes therefrom and into said passageways through said inlet apertures and exits therefrom outwardly of said irrigation tubing through said outlet apertures at a flow rate partially determined by the length of said passageways.

4,022,385

WATER SPRAY NOZZLE

Robert A. Krueger, Mount Clemens, Mich., assignor to Tri-Mark Metal Corporation, Detroit, Mich.

Filed Mar. 18, 1976, Ser. No. 668,320
Int. Cl.² B05B *1/04*
U.S. Cl. 239—592 **17 Claims**



1. In an apparatus for removing contaminant particles from a stream of air, said apparatus being of the type wherein the contaminant-laden air is directed vertically through a horizontally directed water spray so that the contaminants are entrained in the water, a nozzle for producing a flat, fan-shaped solid stream of water, said nozzle having an inlet at one end adapted to be connected to a source of water under pressure, a horizontally elongated outlet at its opposite end from which the water is discharged as a flat fan-shaped solid steam and means defining a water passageway extending generally horizontally between said inlet and said outlet, said passageway including at least two successive flow restricting orifices between the inlet and the outlet, the first of said orifices being located upstream of the second orifice and being of smaller cross section than said inlet, the second orifice being disposed adjacent said outlet and being of smaller cross section than the first orifice and said outlet, said second orifice and said outlet being of rectangular shape in cross section, said passageway including a pair of opposite side walls disposed in generally vertical planes and extending between said first and second orifices, said side walls extending to said second orifice and flaring laterally outwardly from each other in the downstream direction with an included angle therebetween of at least 90°, said nozzle also having other walls extending between said first and second orifices which converge vertically toward each other in the downstream direction, the portion of the nozzle between said second orifice and said outlet being defined by a pair of flat opposite side walls diverging toward said outlet and flat top and bottom walls which are spaced vertically apart in parallel relation.

4,022,386

MATERIAL SPREADER FOR TRUCKS

Emery A. Caye, P.O. Box 148, Detroit Lakes, Minn. 56501

Filed Jan. 15, 1976, Ser. No. 649,461
Int. Cl.² E01C *19/20*
U.S. Cl. 239—657 **12 Claims**

1. A material spreader usable with a dump truck having a material carrying bin with a pair of lateral sidewalls to dispense material from the bin and onto a roadway, comprising:

a material moving apparatus attachable to the truck and mountable adjacent the rear of the bin, said apparatus including dispensing means positionable to receive material from the bin and to release the material in a rearward and downward direction to define a flow of material extending substantially between the lateral sidewalls of the bin, and further including an open-ended conveyor positioned below said dispensing means to receive material from said dispensing means and capable of moving material received from said dispensing means laterally relative to the truck and discharging the material laterally from the open-ended conveyor and onto the roadway; and

ramp means movably mounted to said material moving apparatus and movable between a storage position permitting unobstructed flow of material from said dispensing means to said conveyor, and an operating position overlying said conveyor, wherein said ramp means intercepts material released from said dispensing means, said ramp means when in operating position being angled transversely to said rearward and downward direction of flow rearwardly and downwardly from said dispensing means to rearwardly deflect and distribute the material.

4,022,387

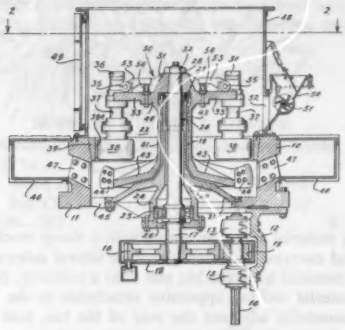
ROLLER GRINDING MILL APPARATUS

Robert M. Williams, Ladue, Mo., assignor to Williams Patent Crusher and Pulverizer Company, St. Louis, Mo.

Filed Mar. 12, 1976, Ser. No. 666,407
Int. Cl.² B02C *15/02*
U.S. Cl. 241—130 **3 Claims**

1. Roller grinding mill apparatus comprising a frame enclosing a space in which material to be ground is confined, a stationary bull ring fixed in said frame in position to have an inwardly presented cylindrically shaped grinding face, a plurality of grinding rollers in said enclosing space, means operably mounting said rollers for rotation about a common axis centered to said cylindrically shaped grinding face and for pivotal movement about axes perpendicular to said common axis of rotation and in planes parallel to said common axis of rotation and in radial directions toward and away from said grinding face, said operable mounting means providing for free movement of said grinding rollers away from said grinding face and limiting the radial movement toward said grinding

face to a predetermined minimum gap spacing between said rollers and said grinding face without any material to be ground between said grinding rollers and said grinding face, and consisting in levered means and resilient elements to set said predetermined minimum gap spacing between said rollers and said grinding face in which said levered means is a hanger pendently supporting each rollers for pivotal movement in said planes parallel to said common axis and a lever arm on each hanger having a free end, and the resilient elements being located adjacent each lever arm free end in position to check lever movement thereby maintaining said gap spacing, means on said frame to admit material to said enclosing space above said bull ring, said material working down by gravity



between said bull ring and grinding rollers to establish a layer of material of such thickness as to space said rollers from said bull ring face a distance greater than said minimum gap spacing, drive means connected to rotate said roller mounting means to generate a centrifugal force proportional to the speed of rotation urging said grinding rollers toward said grinding face whereby said operable mounting means permits said rollers to be free to move radially limited only by said minimum gap spacing, and air supply means on said frame including an air receiving bustle and ports opening between said bustle and the enclosing space in said frame below said bull ring, said ports directing air into the material to fluidize the material being ground.

4,022,388

MOTORIZED CEREAL MILL

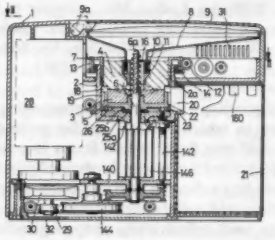
Johann Georg Schnitzer, Feldbergstr. 26, D-7742 St. Georgen, Germany

Filed Oct. 6, 1975, Ser. No. 620,116

Claims priority, application Germany, Oct. 9, 1974, 2448013

Int. Cl.² B02C 7/14

U.S. Cl. 241—246 **15 Claims**



1. A cereal mill adapted for household use having a housing, an enclosure in said housing, a stationary millstone positioned in said enclosure, a shaft rotationally engaged in said enclosure, a rotatable millstone secured to said shaft in opposition to the stationary millstone, a drive for the shaft, and means for adjusting the relative height of the stationary millstone with respect to the rotatable millstone, wherein said means for adjusting comprises:

a supply sleeve, with a channel extending therethrough, fastened to said stationary millstone and having an upwardly open circular groove; a funnel for the feedstock inset in said groove;

a carrier for the statonary millstone secured to said enclosure and having external gearteeth; and a worm drive engaging said gearteeth for the height adjustment of said stationary millstone.

4,022,389

PROCESS AND APPARATUS FOR AUTOMATICALLY FORMING A YARN RESERVE ON A WIND-UP BOBBIN

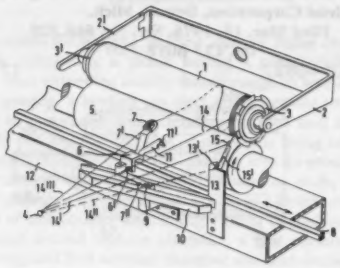
Valter Slavik, Horgen; Hieronimus Ghirlánda, Wattmil; Helmut Ritter, Wattmil, and Arthur Dürr, Wattmil, all of Switzerland, assignors to Heberlein & Co. AG, Wattwil, Switzerland

Filed July 9, 1975, Ser. No. 594,448

Claims priority, application Switzerland, Aug. 16, 1974, 11217/74; May 7, 1975, 5874/75

Int. Cl.² B65H 54/34

U.S. Cl. 242—18 PW **10 Claims**



1. Apparatus for automatically forming a yarn reserve on a wind-up bobbin of a yarn treatment machine comprising means for mounting a bobbin for rotation about a fixed axis, a bobbin mounted in said means, means for rotating said bobbin about said axis, a stationary thread-guide, a slot disc rotatable coaxially with and at one end of said bobbin, said slot disc being operative to pinch and tear off yarn passing through said stationary thread-guide, a first stationary catching thread-guide mounted to catch said yarn as said slot disc rotates and thereupon to guide said yarn while being wound to form a yarn reserve on said bobbin close to said end thereof during rotation of said bobbin and slot disc, a reciprocating thread-guide mounted to traverse said bobbin in moving to-and-fro along a fixed stroke, a movable thread-guide element mounted to reciprocate with said reciprocating thread-guide along said stroke, a second stationary catching thread-guide spaced farther from the wind-up bobbin than the first stationary catching thread-guide, said first and second stationary catching thread-guides and said movable thread-guide element, when approaching one end of said stroke, to pass between said first and second stationary catching thread-guides and to engage said yarn and transfer said yarn from said first catching thread-guide to said second catching thread-guide and, after reversing, to engage said yarn to remove it from said second catching thread-guide, said second catching thread-guide being positioned for said yarn thereupon to enter said reciprocating thread-guide for the yarn to be wound up to fill said bobbin in the wind-up range thereof between said yarn reserve, at one end of said bobbin, and the other end of said bobbin.

4,022,390
DEVICE FOR YARN SPOOLING

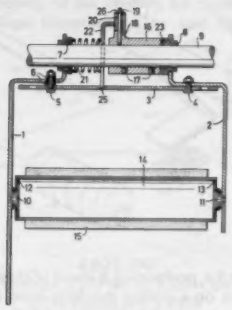
Carlos Matas-Gabalda, Granges-les-Valences, France, assignor to Ateliers de Constructions Bourgeas-Fourgeirol, Valence, France

Filed Sept. 16, 1975, Ser. No. 613,886

Claims priority, application France, Sept. 16, 1974, 74.31300

Int. Cl.² B65H *54/42, 75/02*

U.S. Cl. 242—18 DD **8 Claims**



1. In an apparatus for winding-up yarn on a tubular support, the tubular support being rotatable by tangential contact with a drive cylinder, a stirrup formed from two arms pivotable about an axle, each of the arms having a cheek-plate for engaging on end of the tubular support, one of the arms being axially fixed with respect to the axle, the other of the arms being axially movable, the improvement comprising:

a body portion of the stirrup fixedly connected to the fixed arm and yieldingly connected to the movable arm;

a first flexible bearing carried by the axle and connected to an end of the fixed arm;

a second flexible bearing carried by the axle and connected to an end of the movable arm;

a ring member mounted on the axle adjacent said first flexible bearing;

a cam follower carried by said ring member;

a plate rotatably carried by the axle, one end of said plate operable to rest in a slot in the body portion of the stirrup and the other end of said plate operable as a cam cooperable with said cam follower; and

a spring positioned between said second flexible bearing and said plate to urge said portions of said plate against said cam follower.

4,022,391
SPOOLING MACHINE SYSTEM AND METHOD TO WIND MULTI-LAYER SPOOLS, PARTICULARLY FOR WIRE, TAPE AND THE LIKE

Rudolf Stein, Neuleiningen, and Werner Schmitt, Grunstadt, both of Germany, assignors to Drahtwarenfabrik Drahtzug Stein KG, Drahtzug near Grunstadt, Germany

Filed Mar. 3, 1975, Ser. No. 554,748

Claims priority, application Switzerland, Mar. 13, 1974, 3523/74; Mar. 13, 1974, 3522/74

Int. Cl.² B65H *54/28*

U.S. Cl. 242—25 R **31 Claims**

1. Controlled spooling machine system for layer windings of elongated materials (1) having circular, elliptical, or polygonal cross section, on a rotating spool (3) having a predetermined axial extent, comprising

winding speed sensing means (28) sensing the speed of the spool and deriving a winding speed signal (29) representative of speed of rotation of the spool;

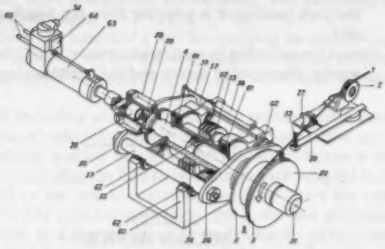
means (9) providing a material size signal (91) representative of the width of the material;

a guide means (2) guiding the material towards the spool so that the material will define an angle of attitude (α) with respect to a plane transverse to the axis of rotation of the spool;

means (20, 21, 22) sensing the attitude angle (α) of the material as it is supplied to the spool, at any instant, and providing an attitude signal (23, 39);

traverse means (35, 64, 69, 70) effecting relative axial traverse movement between the spool (3) and the guide means (2) to effect progressive adjacent winding of the material on the spool and the formation of superimposed layers between the axial limits of the spool, and

traverse control means (19, 24) controlling said traverse means (35) and having said winding speed signal, said material size signal (91) and said attitude signal applied



thereto and providing a command output signal to said traverse means (35) to command the relative position between said guide means (2) and the instantaneous axial position of the spool (3) such that the material, as it is wound on the spool, is pressed against the next previously applied winding on the spool, by controlling the attitude angle (α) of the material with respect to the spool, as the material is wound on the spool, to reach a predetermined value, and to change the speed of the relative traverse movement in predetermined axial ranges (6, 8) of material placement on the spool, and occurring just before, and after the formation of superimposed windings adjacent the axial ends of the spool such that the attitude angle (α) will tend to become zero as the wire is wound on the spool and approaches an axial end thereof, and, then after formation of a new winding layer, the attitude angle is again controlled to reach said predetermined value.

4,022,392
APPARATUS FOR REMOVING PACKAGES FROM TEXTILE YARN WINDER

William A. Thomas, Jr., Blacksburg, Va., and James C. Baugh, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1975, Ser. No. 641,789

Int. Cl.² B65H *67/00*

U.S. Cl. 242—41 **5 Claims**

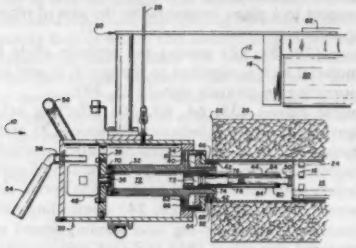
1. Apparatus for doffing a yarn package from a winder, the yarn being wound on a hollow tube, the hollow tube in turn being mounted on a winding mandrel of the winder, rotatively locked thereon and having an end portion of the tube extending axially outwardly of the end of the winding mandrel, the apparatus comprising:

gripping means adapted for being inserted within the outwardly extending portion of the hollow tube and being actuatable for expanding radially outwardly into gripping engagement with the inside surface of the tube end portion;

means for rotating the gripping means and the hollow tube it is gripping relative to the winding mandrel to release

the yarn package from its rotatively locked position on the winding mandrel;

means actuatable for withdrawing the gripping means and



the yarn package it is gripping from the winding mandrel; and

means for actuating in succession, respectively, the gripping means, the rotating means and the withdrawing means.

4,022,393

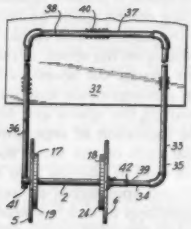
ROLLER DEVICE

Michael Curcio, 168-17 Cryders Lane, Whitestone, N.Y. 11357

Filed Jan. 12, 1976, Ser. No. 648,480

Int. Cl.² B65H *19/02*

U.S. Cl. 242—55.2 **6 Claims**



1. A roller device for a strip of flexible material, said roller device comprising

a shaft having spaced opposite first and second ends;

a first disc-type plate coaxially affixed to the first end of the shaft and rotatable with said shaft;

a second disc-type plate coaxially mounted on the shaft;

fastening means for releasably affixing the second plate to the shaft at any desired point thereon between the first plate and the second end of the shaft for rotation with said shaft;

retaining means on at least one of the first and second plates for retaining an end of a strip of flexible material in position at said one of said plates and at said shaft whereby said strip is selectively windable on and unwindable from said roller device; and

a support device releasably coupleable to said roller device for rotatably mounting said roller device in operative proximity with a work surface, said support device comprising frame means having spaced opposite first and second end areas, mounting means affixing the frame means in the first end area thereof to a work surface, and bearing means mounted in the frame means in the second end area thereof rotatably mounting the first and second ends of the shaft.

4,022,394

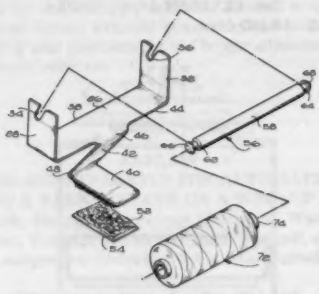
SPOOL HOLDER APPARATUS

Lawrence J. Gudde, 4924 Beatty Drive, Riverside, Calif. 92504

Filed Dec. 29, 1975, Ser. No. 644,576

Int. Cl.² B65H *49/00, 49/18*

U.S. Cl. 242—129.6 **2 Claims**



1. Apparatus for positioning a spool of thread in a generally horizontal plane on a sewing machine head comprising:

a base having a pair of vertically extending arms;

a spool holder formed of an elongated member secured at its ends to said arms, respectively, and having an axis perpendicular to said arms;

means for securing said base to said machine including a spring enabling the base to flex with respect to said securing means, and

a mounting plate removably secured to said machine head, said spring interconnecting said base and said mounting plate.

4,022,395

TAPE CASSETTE

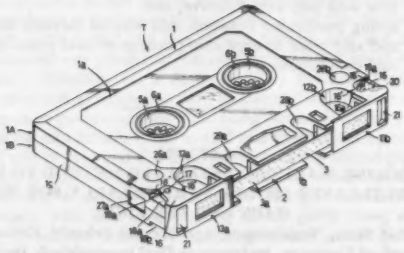
Yoshio Kishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 2, 1975, Ser. No. 636,829

Claims priority, application Japan, Dec. 3, 1974, 49-138985

Int. Cl.² G03B *1/04*; G11B *15/32, 23/04*

U.S. Cl. 242—198 **19 Claims**



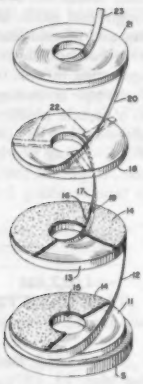
1. A tape cassette comprising a housing of generally rectangular configuration having substantially parallel top and bottom walls and a peripheral wall extending between said top and bottom walls along three of the sides of the housing so as to define an opening between said top and bottom walls along the fourth side of the housing; reel means rotatably disposed in said housing and having a supply of tape wound thereon; guide means in said housing for guiding said tape in a run extending along said fourth side of the housing; said top and bottom walls having at least a pair of cutouts therein which communicate with said opening and through which tape withdrawing and lid opening means may be inserted in said housing and

then moved out of said cutouts through said opening; and a pair of lid members pivotally mounted on said housing adjacent the corners of the latter which are at opposite ends of said fourth side for swinging movement in directions parallel to the planes of said top and bottom walls between a closed position, in which each of said lid members extends along at least part of said fourth side of the housing across a respective one of said cutouts for covering at least a respective part of the tape in said run, and an opened position, in which each said lid member is displaced from said opening in response to the movement of said lid opening means out of said cutouts through said opening of the housing for permitting the withdrawal of the tape therethrough by said tape withdrawing means.

4,022,396
INTERCONNECTED STACKED COILS FOR CONTINUOUS FEED

Edward A. Manchester; Bernard F. Talty, both of Mattapoisett, Mass., and Earle A. Hallstrom, Barrington, R.I., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed Oct. 31, 1975, Ser. No. 627,764
Int. Cl.² B65H *17/48*
U.S. Cl. 242—55.17 **9 Claims**

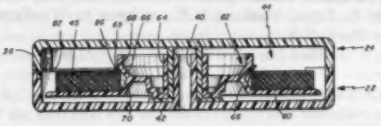


1. A plurality of interconnected coils of flat strip material for substantially uninterrupted, multicoil supply of the material for an extended period of time to a use application such as a machine during a manufacturing process and the like, said coils comprising a first coil of the material connected serially to an adjacent coil by an interconnecting portion of the material extending from one coil to the other, the interconnecting portion of the coils being arranged so that the strip of material may be continuously unwound from one coil to the next for uninterrupted supply to a machine and the like, individual coils of said plurality of coils being free of binding straps and like coil confining means, and separating means of flat friction material interposed between said coils with said coils both being in contact with said separating means so that said coils can be arranged in a stacked configuration with one coil on top of the other, said separating means defining a passage permitting said interconnecting portion to pass said separating means in a manner such that said strip material flows from one coil to the other without jamming or interrupting the flow thereof.

4,022,397
8-TRACK CARTRIDGE

Alan Lowry, Canton, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.

Filed Aug. 18, 1975, Ser. No. 605,532
Int. Cl.² G11B *23/10;* **B65H** *17/48*
U.S. Cl. 242—55.19 A **10 Claims**



8. An endless tape cartridge comprising a base and a cover, peripheral walls attached to the cover and base for enclosing the sides and rear of the cartridge and providing an open front edge,

a spindle in the base and a reel for carrying an endless tape pack mounted on the spindle, said reel having a flange and an upwardly extending hub that surrounds the spindle,

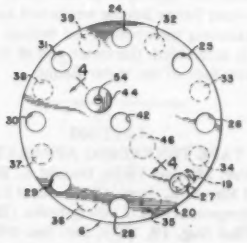
said hub including an upper cylindrical portion and a lower portion of reduced diameter with the bottom of the upper cylindrical portion being spaced above the flange a distance exceeding the height of the tape pack adapted to be wound on the reel to create an overhang above the tape,

and a flexible member carried by the cover and extending inwardly to a position beneath and inwardly of the overhang for preventing the inner convolutions of tape in the pack from riding up on and coning about the upper cylindrical portion of the hub, said member overlying the tape pack and without any of the loop overlying the member so that the cover may be assembled on the base with the member on it without the need for threading the tape over the member.

4,022,398
HOSE REEL

John W. Youngblood, 3201 Franklin, Waco, Tex. 76710

Filed Dec. 22, 1975, Ser. No. 643,299
Int. Cl.² B65H *75/40*
U.S. Cl. 242—96 **15 Claims**



1. A reel onto which an elongated member is wound comprising; a hollow cylindrical member having a cylinder wall and a central bore, said hollow cylindrical member having a passage formed in the cylinder wall, said passage communicating with said central bore, a first end of the elongated member being positionable through said passage; first and second flange elements secured to opposite ends of said hollow cylindrical member; a handle; a shaft extending through aligned openings in said first flange element and in said cylinder wall; means restraining said shaft against longitudinal movement through said openings; means securing said handle to said shaft; anchor means on one of said flange elements adapted to engage a second end of the elongated member when the elon-

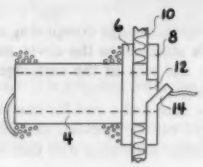
gated member is wound around said hollow cylindrical member, said anchor means being spaced from said hollow cylindrical member.

4,022,399

SCREW-IN TUBE WITH BREAKABLE TABS FOR COIL OF FLEXIBLE MATERIAL WITH INNER END PAYOUT

Ronald E. Zajac, Yonkers, N.Y., assignor to Windings, Inc., New York, N.Y.

Filed June 1, 1976, Ser. No. 691,617
Int. Cl.² B65H *55/02*
U.S. Cl. 242—163 **1 Claim**



1. In combination with a coil of material wound in a plurality of layers each composed of a series of figure-eights with the cross-overs progressing angularly around the package and having an axial opening therethrough and a radial opening extending through the wall of the coil into the axial opening, and a container enclosing said coil, a tube arranged in said radial opening and having a flange spaced from the free end thereof engaging the outside of the coil and a second flange spaced from the first flange towards the free end of the tube by a distance substantially equal to the thickness of the wall of the container, the wall of the container having an opening therein and notches extending outwardly from the opening, said second flange having gaps therein and the portions adjacent the gaps being sloped outwardly in the same circumferential direction, whereby when the second flange is moved towards the inside of the wall of the container said slanted portions engage in the notches extending from the opening in the wall of the container and upon turning will ride up on the outside of the wall of the container so as to position the tube in the opening in the wall of the container with the flanges positioned on opposed sides of the wall of the container, the points of connection between the outwardly extending members and the outer flange having weakened areas to permit the outwardly extending members to be broken off readily after the package is assembled, the outer end of the tube terminating at the outer face of the outer flange.

4,022,400

TAPE THREADING APPARATUS

Gerhard Rotter, Mission Viejo; Donald L. Burdorf, Newport Beach, and Harold E. Arns, Chino, all of Calif., assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Aug. 19, 1974, Ser. No. 498,446
Int. Cl.² G11B *15/32, 15/66*
U.S. Cl. 242—192 **12 Claims**

1. An apparatus for automatically threading a supply reel of tape having a self-starting leader into a tape transport mechanism of the type in which the rotatable supply reel and take-up hub are movable relative to and urged towards the capstan in order to be simultaneously driven through surface engagement of the outer periphery of said reel and hub with the outer periphery of said capstan, said apparatus comprising:

a peeling means to peel said leader from said supply reel;

guide means to direct said leader through the tape path between said leader and said hub;

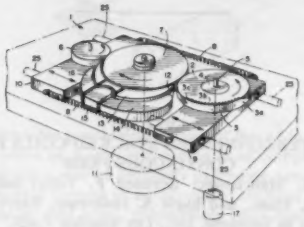
a means to selectively rotate said capstan in at least one mode in a first sense of rotation and in at least one mode in a second sense of rotation;

a means for reducing or eliminating the contact pressure between said supply reel and said capstan; and

automatic sequencing means, including at least timing means and tape detecting means, and connected to said capstan-rotating means and said contact pressure reducing means over first and second circuit connections, respectively;

said automatic sequencing means, under the control of said timing means, being effective to control said capstan-rotating means over said first circuit connections through a threading cycle comprising a plurality of phases

during a first of which phases said capstan-rotating means is operated in said second sense to drive said supply reel in a direction opposite to the playing direction, thereby to secure said self-starting leader onto the outermost convolutions of said supply reel of tape, and



during a second of which phases said capstan-rotating means is operated in said first sense to drive said supply reel in the playing direction, thereby to cause said peeling means to peel said leader off said supply reel and push said leader through said guide means so as to at least cause the leading end of said leader to be captured between said take-up hub and said capstan; and

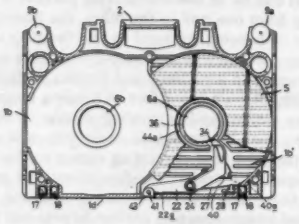
said automatic sequencing means, in response to a change of condition of said tape detecting means when said tape has advanced to a certain position, causing said contact pressure reducing means to be activated over said second circuit connections, during a predetermined portion of said second phase, to permit the take-up hub to remove the slack in the tape resulting from said pushing of the leader.

4,022,401

TAPE CASSETTE

Yoshio Kishi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 642,113, Dec. 18, 1975, abandoned. This application Mar. 23, 1976, Ser. No. 669,651
Claims priority, application Japan, Dec. 24, 1974, 50-135; Apr. 8, 1975, 50-42526
Int. Cl.² G11B *23/10*
U.S. Cl. 242—198 **19 Claims**



1. A tape cassette comprising: a housing; at least one reel rotatably disposed in said housing and having a circular series

of raked teeth which define respective substantially radially directed surfaces facing in one of the directions of rotation of the reel; a supply of tape wound on said reel so as to be unwound from the latter upon rotation of the reel in said one direction and rewound on the reel upon rotation of the latter in the opposite direction; and braking means for each said reel including a support member movable in said housing between an engaged position and a disengaged position, a pawl-like member carried by said support member to be positioned against said raked teeth of the respective reel in said engaged position of the support member and being spaced from said raked teeth in said disengaged position, means mounting said pawl-like member for angular displacement in respect to said support member so that, with the latter in said engaged position, rotation of said respective reel in said opposite direction for rewinding the tape thereon causes said raked teeth to move past said pawl-like member as the latter is angularly displaced in one direction relative to said support member to substantially free the reel for said rotation in said opposite direction thereof, whereas rotation of said respective reel in said one direction for unwinding the tape therefrom brings one of said substantially radially directed surfaces of the raked teeth against said pawl-like member so as to urge the latter to be angularly displaced in the opposite direction relative to said support member, and abutment means engageable by said pawl-like member in said engaged position of the support member for blocking said angular displacement of said pawl-like member in said opposite direction relative to said support member and thereby preventing the unwinding of the tape from said reel.

4,022,402

CONTAINER FOR MAGNETIC TAPE

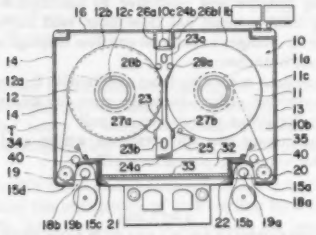
Toshio Morimoto, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 14, 1975, Ser. No. 632,161

Claims priority, application Japan, Nov. 21, 1974, 49-142171[U]; Nov. 21, 1974, 49-142172[U]; Nov. 21, 1974, 49-142173[U]; Dec. 10, 1974, 49-149883[U]; Dec. 10, 1974, 49-149884[U]; Dec. 10, 1974, 49-149885[U]

Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*

U.S. Cl. 242—199 **9 Claims**



1. A tape container for accommodating therein a magnetic tape designed for use in a magnetic recording and/or reproducing apparatus of the type having a container receiving chamber, as least one recording and/or reproducing transducer supported in position for movement between engaged and disengaged positions, and at least one capstan and an idler wheel cooperative with said capstan for driving the magnetic tape, said tape container comprising:

a housing of generally rectangular configuration including first and second generally rectangular spaced plate members and a peripheral wall extending between said first and second plate members along three of the sides thereof;

a first access opening means, defined in said housing along the fourth side thereof, for allowing access to a portion of the magnetic tape and for receiving the transducer when moved to the engaged position thereof so that the transducer may engage said portion of the magnetic tape;

first and second reels to which respective ends of the magnetic tape are secured, said first and second reels being rotatably supported within said housing in spaced relation to each other, each of said first and second reels having at least one radially outwardly extending flange;

second and third access opening means defined in said housing along said fourth side thereof and at opposite sides of the first access opening for selectively alternately receiving therethrough, when the tape container is placed within the container receiving chamber, the capstan in readiness for driving the magnetic tape from either of one of the said first and second reels towards the other of said first and second reels in cooperation with the idler wheel;

protective covering means, supported by said housing at a position aligned with said first access opening means, for movement between projected and retracted positions in a direction perpendicular to a plane of said portion of the magnetic tape and in a plane parallel to said first and second plate members of the housing, said protective covering means when in said projected position covering said portion of the magnetic tape;

means for biasing said protective covering means to said projected position thereof; and

said protective covering means, when moved to said retracted position thereof against said biasing means with the transducer held in the engaged position thereof, permitting said portion of the magnetic tape to be located outside of said protective covering means and exposed to the exterior through said first access opening means with the transducer contacting that portion of the magnetic tape.

4,022,403

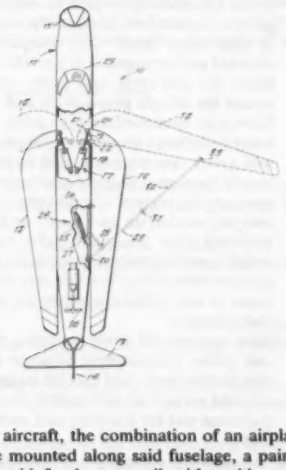
CONVERTIBLE AIRCRAFT

Louis Francois Chiquet, P.O. Box 3134, Jacksonville, Fla. 32206

Filed Jan. 28, 1976, Ser. No. 643,475

Int. Cl.² B64C *3/40*

U.S. Cl. 244—46 **1 Claim**



1. In a convertible aircraft, the combination of an airplane fuselage, a jet engine mounted along said fuselage, a pair of wings connected to said fuselage, a tail with rudder, and means for said wings to be retracted from a sidewardly extended position to a position alongside said fuselage, said means comprising for each wing a hydraulic cylinder located in a forward portion of said fuselage, said hydraulic cylinder having a piston rod which at its end is pivotally connected to

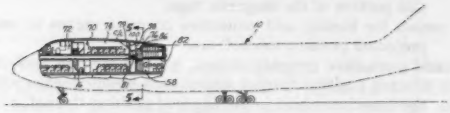
an inboard end of said wing which is located close to a pivot about which said wing pivots, and a bracing mechanism being located in a rear portion of said fuselage, said bracing mechanism including a second hydraulic cylinder pivotable at one end about a stationary pin on said fuselage, a piston of said second cylinder being attached at its outward end to an intermediate portion of an arm which at its one end is pivotable about another stationary pin of said fuselage, an opposite end of said arm being pivotally attached to one end of a brace which at its other end is pivotally attached to said wing.

4,022,404

UPPER DECK MAIN GALLEY IN A THREE DECK, WIDE-BODIED PASSENGER AIRPLANE

Rashad S. Greiss, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 22, 1975, Ser. No. 624,961
Int. Cl.² B64D *11/04*
U.S. Cl. 244—118 P **5 Claims**



1. In a passenger aircraft having a fuselage including an upper, forward lobe thereon, said fuselage having a lower deck, a middle, passenger-carrying deck, and a third, upper deck in said lobe, said third deck having a crew compartment and a passenger-carrying section, said passenger-carrying section of said third, upper deck being interconnected by stairs with said middle deck, said fuselage having doors therein communicating from the outside of said fuselage with said middle deck for passenger ingress and egress and for loading and unloading passenger support supplies including food and beverage containers, said food and beverage containers comprising wheel-supported carts of predetermined size and shape, the improvement comprising:

a galley compartment in the aft portion of said upper deck, said galley compartment including a forward wall oriented transversely to said fuselage for partitioning said galley compartment from said passenger-carrying section of said upper deck, said compartment being so constructed and arranged as to provide inflight storage receptacles for said carts, said galley compartment including means for inflight preparation and servicing of food and beverages contained in said carts, said galley compartment including a door means for providing crew access to said galley compartment, said door means being located in said forward wall and communicating with the passenger-carrying section of said upper deck, said passenger-carrying section on said upper deck having a first predetermined floor level, said galley compartment having a second predetermined floor level lower than said first predetermined floor level so as to provide adequate headroom in said galley compartment for crew in said galley compartment;

at least one cart lift interconnecting the forward portion of said galley compartment adjacent said forward wall and said middle deck, said cart lift including means for elevating said carts from said middle deck to said galley compartment and for lowering said carts to said middle deck, and

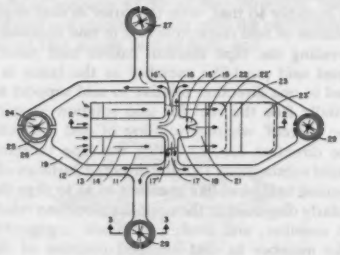
a first auxiliary compartment located on said middle deck, said cart lift opening into said first auxiliary compartment, said first auxiliary compartment being located centrally in the transverse dimension of said middle deck and adjacent at least one of said fuselage doors, said food and beverage containers being sized to fit through said passenger doors in said fuselgage, said cart lift being sized to receive only such containers, and said inflight storage receptacles being sized to receive only such containers.

4,022,405

FAN LIFT-CRUISE V/STOL AIRCRAFT

John M. Peterson, LaJolla, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,499
Int. Cl.² B64C *15/04*
U.S. Cl. 244—123 **5 Claims**



1. A propulsion system for use in an aircraft for making vertical and short takeoffs and landings comprising:

at least one gas turbine engine having a core turbojet, a bypass fan, and a turbojet exhaust gas conducting tailpipe;

a plurality of lifting fans, each fan having spoiling means to selectively spoil lift;

exhaust gas duct extending from said exhaust gas conducting tailpipe to each of said lifting fans for communicating turbojet exhaust gas from said turbojet to said lifting fans for powering said lifting fans;

said exhaust gas duct being divided into two major independent branches, each of said branches supplying a forward fan, an aft fan, and a side fan of said plurality of fans;

exhaust gas duct closure means operative to selectively restrict exhaust gas flow through each of said branches;

a compensating nozzle attached to said exhaust gas conducting tailpipe and operative to maintain a predetermined total exhaust gas flow from said turbojet in response to changes in exhaust gas flow through said exhust gas duct branches;

bypass fan duct extending from said bypass fan and defining a gas turbine efflux discharge port for communicating bypass fan efflux therebetween; and

deflection means pivotally retained within said discharge port for vectoring gas turbine efflux.

4,022,406

AUTOMATICALLY VARIABLE MULTISTAGE PARACHUTE

Jon T. Matsuo, El Centro, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 23, 1975, Ser. No. 589,180
Int. Cl.² B64D *17/34*
U.S. Cl. 244—152 **1 Claim**

1. A parachute comprising:

a canopy having a hemispherical drag surface with an apex;

a set of fixed-length suspension lines connecting the canopy hem to a load;

a vertical pull down vent line connected between the canopy apex and the load;

at least a portion of said pull down vent line being made of elastic material extending the effective length of the pull down vent line approximately one-half of its relaxed length to vary the air-turn-around distance in the canopy

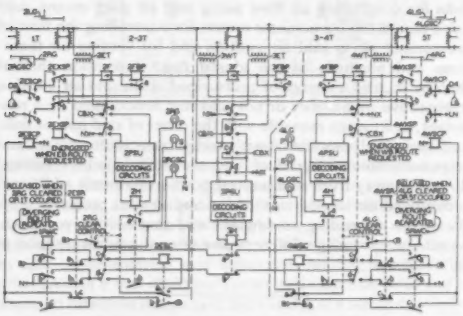
depending on the parachute ejection airspeed and to vary the air-turn-around distance before the canopy fully opens;

the relaxed length of said pull down vent line is less than the length of the line from the load to the canopy hem plus the radius of the full canopy so that the area of the canopy at the apex is dimpled in the fully inflated condition of the canopy.

4,022,407
RAILROAD TRAFFIC CONTROL SIGNALING SYSTEM

Crawford E. Staples, Edgewood, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Jan. 16, 1976, Ser. No. 649,910
Int. Cl.[2] B61L *19/16*
U.S. Cl. 246—34 R **19 Claims**



1. A railroad traffic control system, for a stretch of track divided into a plurality of insulated track sections and through which trains move in either direction normally under the authority of train-carried cab signals, comprising in combination:

a. a reversible track circuit means for each track section for detecting the occupancy of that section by a train,

b. a traffic line circuit network extending the length of said stretch and selectively reversible for requesting a traffic route direction through said stretch,

c. a traffic relay at each end of said stretch controlled by said traffic line circuit network for establishing a requested direction of traffic movement through said stretch,

d. a super-clear relay at each end of said stretch,

e. a block indication line circuit network extending the length of said stretch,

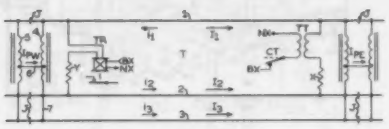
f. said block indication line circuit network coupled to each super-clear relay and jointly controlled by said traffic relays, the plurality of reversible track circuit means, and responsive to the absence of an authorization for a train to enter at an established exit end of said stretch, for energizing the super-clear relay at an established entrance end when the corresponding traffic direction is established and each track section is unoccupied, and

g. a signal means at each end controlled by the corresponding super-clear relay for displaying a signal indication to authorize a train without operative cab signal apparatus to traverse said stretch when said corresponding super-clear relay is energized.

4,022,408
TRACK CIRCUITS WITH CAB SIGNALS FOR DUAL GAGE RAILROADS

Crawford E. Staples, Edgewood, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed Mar. 3, 1976, Ser. No. 663,516
Int. Cl.[2] B61L *21/06*
U.S. Cl. 246—34 R **17 Claims**



1. A track circuit arrangement for a section of electrified, dual gage railroad, including a common rail and a first and a second other rail at different track gages from said common rail, said section being insulated in each rail from both adjoining sections, comprising in combination,

a. a source of track circuit energy coupled at the exit; end of said section between said common rail and the other rails for supplying train detection energy, said first and second other rails being coupled to form a parallel circuit path between the ends of said section,

b. a train detection means responsive to energy from said source and coupled at the entrance end of said section between said common rail and said other rails for detecting the occupancy of said section by a train of either gage,

c. an impedance bond coupled between said common rail and said other rails at each end of said section and having one winding tap positioned to establish a preselected turn ratio between the two portions of the winding, and

d. a connection between the winding tap of each impedance bond and the corresponding tap of an adjoining section bond for completing a return circuit for the propulsion current such that the reflux generated by the propulsion return current in each impedance bond on one side of said tap balances that developed on the other side of said tap.

4,022,409
ELECTRICALLY DRIVEN APPARATUS FOR OPERATING A RAILWAY

Tom Ensink, Velsen-Zuid, and Rieks Zonderman, Castricum, both of Netherlands, assignors to Hoogovens Ijmuiden BV, Ijmuiden, Netherlands

Filed June 30, 1976, Ser. No. 701,413
Claims priority, application Netherlands, June 30, 1975, 7507735
Int. Cl.[2] B61L *5/06*
U.S. Cl. 246—218 **11 Claims**

1. Electrically driven apparatus for operating a railway point having

a. a slidable operating member for moving the tongues of the point between their two extreme positions to switch the point,

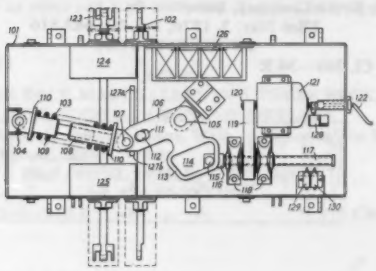
b. biassing means connected to the said operating member and adapted to act upon the said operating member so as to hold the tongues of the point in whichever one of the said extreme positions the point is located,

c. a lever connected to the said operating member, the lever having an aperture at a location spaced from the said operating member,

d. a driving member having a driving element located in the said aperture in the said lever, the aperture being of a size

and shape to permit relative movement of the lever and the driving element,

e. electric motive means adapted to move said driving member in either of two opposed directions, the arrangement being such that the electric motive means moves the operating member through the said driving element and the said lever, so as to switch the point from either one of said extreme positions to the other,



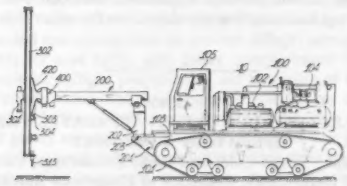
f. control means for said electric motive means, arranged to be actuated when the point reaches one of said extreme positions in a switching operation, and adapted when so actuated to cause reversal of the electric motive means to bring the said driving member back to an intermediate position at which the said driving element is so located in the said aperture that the lever can move relative to the driving element if the point is forcibly moved by the wheels of a passing vehicle.

4,022,410

UNIVERSAL COUPLING

James M. Ewart, North Vancouver; Clay H. Anderson, West Vancouver, and Gerard St. Jean, Vancouver, all of Canada, assignors to C. H. Anderson and Associates Ltd., North Vancouver, Canada

Filed Oct. 24, 1975, Ser. No. 625,460
Int. Cl.² F16M *11/04*
U.S. Cl. 248—2 **6 Claims**



1. A universal coupling for use in mounting a work head on a boom to controllably position the work head by pivotal movement about two mutually perpendicular axes comprising:

a. a first housing having a base for mounting on a member such as a boom;

b. a first power driven worm mounted on said first housing in drive relation with a first worm gear journalled in said first housing for rotation therein and having a hub portion exposed through an opening in a wall of said first housing;

c. a second housing having a base secured directly to the hub of said first worm gear; and

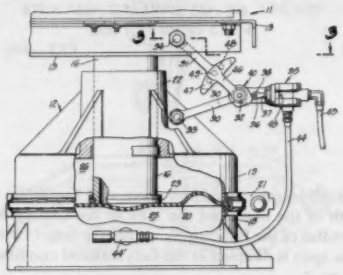
d. a second power driven worm mounted on said second housing in drive relation with a second worm gear, said second worm gear being mounted for rotation in said second housing and having a mounting face exposed through said second housing for mounting a tool work head.

4,022,411

SELF-LEVELLING SEAT SUSPENSION SYSTEM FOR VEHICLES

Thomas R. Rumsey, Buena Park, Calif., assignor to Royal Industries, Inc., Compton, Calif.

Filed June 27, 1975, Ser. No. 591,021
Int. Cl.² A45D *19/04*
U.S. Cl. 248—400 **12 Claims**



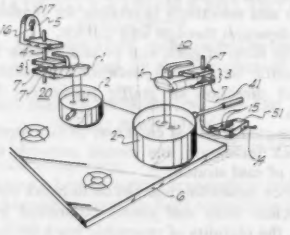
1. In combination, a vehicle seat suspension system of the type having a base unit reciprocally supporting a seat unit on an air cushion therebetween, duct means for supplying pressurized air to said air cushion, torque control linkage means interconnecting said seat and base units to prevent relative rotation thereof and including at least one pair of pivotally connected links, level control means carried by one of said links for controlling air flow along said air duct means, said valve means having actuator means for controlling the flow of pressurized air to said air cushion and for venting air therefrom and normally in the closed neutral position thereof thereby to trap a charge of pressurized air in said air cushion irrespective of whether or not said seat is occupied by a passenger, and means movable with the other of said pair of links and operatively associated with said valve actuator means and responsive to movement of said seat unit in either vertical direction away from said neutral position to admit additional pressurized air to said air cushion and to vent pressurized air therefrom depending on whether said seat unit moves downwardly or upwardly relative to the normal neutral position of said seat unit.

4,022,412

FOOD MIXER SUPPORT

Harold A. Houlf, Calumet Park, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,782
Int. Cl.² F16F *15/00*; F16M *1/00*
U.S. Cl. 248—13 **1 Claim**



1. A food mixer support adapted for being affixed to a vertical surface comprising:

a. an L-shaped base including an upward extending first member for engaging the vertical surface, which first member defines a slotted hole adapted for accepting a

mounting screw, and an outward extending second member with a vertical hole extending therethrough proximally of the outer end;

b. an arm consisting essentially of a rod extending through the vertical hole and downward of the second member, the rod being fixed in the hole; and

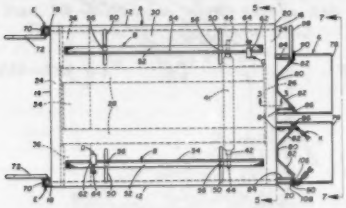
c. a clamping means including two jaws, each including a flat rubber covered horizontal face, a vertical hole extending through each jaw adjacent to one end thereof, slidably engaging the rod, a horizontal threaded hole in the end of each jaw intersecting the vertical hole, and a thumb screw engaging each threaded hole for arresting motion of the jaw with respect to the rod, wherein the horizontal faces are parallel and disposed opposite one another; whereby the jaw are adapted for grasping any portable electric food mixer so as to adjustably position the mixer relative to the food being mixed.

4,022,413

WHEELED SUPPORT AND TRANSPORT PLATFORM

Harold Isaacs, 2567 Lafayette Drive, University Heights, Ohio 44118

Filed Mar. 25, 1976, Ser. No. 670,348
Int. Cl.² F16M *3/00, 11/04*
U.S. Cl. 248—23 **12 Claims**



1. A generally rectangular wheeled support and transport platform for electric welders or the like, said platform having front and rear ends and opposite sides and an upper surface for supporting a welder power unit thereon, adjustable holding means on said platform extending above said upper surface for holding a welder power unit against sliding movement relative to said upper surface, said adjustable holding means being adjustable in a first direction across said opposite sides and in a second direction across said front and rear ends and includes a plurality of spaced-apart slots through said platform and being elongated in said first direction, a plurality of generally L-shaped holding members having first legs positioned against said upper surface and second legs extending upwardly therefrom, and releasable clamping means extending through said first legs and said slots for releasably clamping said holding members against movement relative to said platform.

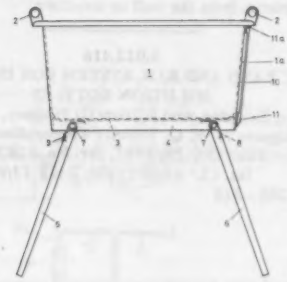
4,022,414

BASKET WITH FOLDABLE LEGS

Charlotte Egger, Wulflingerstrasse 30, 8004 Winterthur, Switzerland

Filed Oct. 14, 1975, Ser. No. 621,766
Claims priority, application Switzerland, Oct. 25, 1974, 14373/74
Int. Cl.² A47G *23/02;* **F16M** *11/32*
U.S. Cl. 248—150 **8 Claims**

1. A multi-purpose basket, particularly useful as a wash basket, comprising a basket member having a bottom and a top, legs pivotally secured to the bottom of said basket member and displaceable between a first position folded against the bottom of said basket member and a second position extending downwardly from said basket member for supporting said basket member above the ground or floor, at least one pivot pin being provided for each said leg and a spring being positioned on each said pivot pin in engagement with the bottom of said basket and said leg for biasing said leg into the second position, a pawl member located on the bottom of said basket member, said pawl member being displaceable between a locking position holding one of said legs in the first position and a releasing position so that said leg held in the first position can be moved to the second position, and a slide



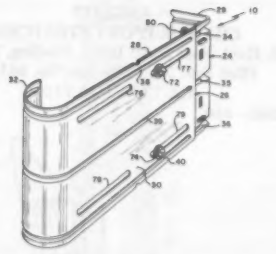
displaceably mounted on said basket, said slide extends and is displaceable in the upward direction of said basket between its bottom and top, said pawl connected to the lower end of said slide so that by pulling upwardly on said slide, said pawl member is displaced from locking engagement with one of said legs.

4,022,415

SUPPORT FOR TIE BACK AND RETURN OF DRAPERY

Zackary A. Roderick, Bethel Island, and Robert G. Ross, Fremont, both of Calif., assignors to Galgon Industries, Inc., Fremont, Calif.

Filed Sept. 2, 1975, Ser. No. 609,595
Int. Cl.² A47H *19/00*
U.S. Cl. 248—298 **1 Claim**



1. A support for holding the tie back and return of a drapery in relationship to a wall or other structure, the drapery hanging down along the wall in vertically extending folds with the return projecting toward the wall, the support comprising the combination of a base having a mounting flange at its proximal end for mounting the base to project generally perpendicular from the wall or structure adjacent one side of the return, an extension arm having a distal end for supporting a portion of the tie back and return, a plurality of parallel vertically spaced grooves formed along one surface of the base or arm, a plurality of parallel vertically spaced ribs formed along one surface of the respective arm or base, said ribs being sized for cooperative seating engagement in one mode of assembly in the grooves with the longitudinal axis of the arm projecting in horizontal alignment with the longitudinal axis of the base, or in an alternate mode with the longitudinal axis of the arm offset vertically from the longitudinal axis of the base, a plurality of parallel vertically spaced slots formed in the base or arm,

a plurality of openings formed through the respective arm or base with the openings being in register with the slots in both of said modes, and fastener means extending through the grooves and openings with the fastener means adjustable for loosely supporting the arm on the base to permit relative sliding adjustment therebetween, and the fastener means further being adjustable for rigidly holding the arm on the base at a position where the drapery return is supported at a selected distance from the wall or structure.

4,022,416

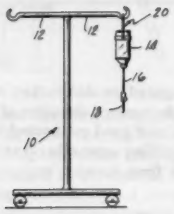
PLASTIC BAND AND BAIL SYSTEM FOR INTRAVENOUS SOLUTION BOTTLES

Saul Kaye, Evanston, and William G. Whitney, Skokie, both of Ill., assignors to W. G. Whitney Corporation, Skokie, Ill.

Filed Oct. 29, 1975, Ser. No. 626,652

Int. Cl.² A44B *21/00;* **B42F** *13/00*

U.S. Cl. 248—318 **10 Claims**



1. A plastic bail and band system for attachment to an intravenous solution bottle, comprising:

a plastic band attachable in a groove in a wall of the bottle near a base thereof, the band being made of a plastic which shrinks circumferentially upon heating to sterilizing temperatures; and

a plastic bail member attached to said band at opposite ends of said member at substantially diametrically opposed positions on said band.

4,022,417

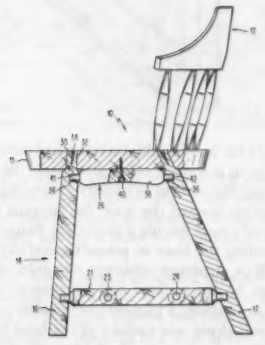
CHAIR SUPPORT STRETCHER

Shelley M. Hunt, Sans Souci Drive, Pawling, N.Y. 12564

Filed Feb. 25, 1976, Ser. No. 661,373

Int. Cl.² F16M *11/32*

U.S. Cl. 248—440 **7 Claims**



1. In a chair having a seat and at least two legs joined to said seat, said seat having two cylindrical vertical holes extending completely through said seat, said legs having upper cylindrical ends fitted into said holes and extending through said seat whereby the upper surfaces of said legs and seat are flush, said legs having transverse cylindrical holes opening towards each other and located immediately beneath said seat, a support stretcher extending between and joined to said legs beneath said seat, said stretcher having a medial body portion abutting the underside of said seat and end portions fitted into said holes in said legs, whereby said stretcher is operative to prevent said upper ends of said legs from working upwardly through said seat due to prolonged usage and wear.

4,022,418

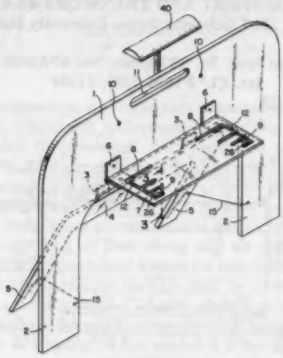
READING STAND

Sam J. Kellner, 315 E. 69th St., New York, N.Y. 10021

Filed Feb. 9, 1976, Ser. No. 656,173

Int. Cl.² A47B *97/04*

U.S. Cl. 248—460 **7 Claims**



1. A reading stand comprising a U-shaped main panel having a parallel pair of legs spaced apart by a cross member, a table for supporting reading material, table fastening means coupling said table to said cross member to permit angular movement of said table forward of said main panel, a U-shaped flap having a parallel pair of legs spaced apart by a cross member fashioned to fit within and contiguous to the interior of said U-shaped main panel, said cross member of said flap being disposed contiguous to said cross member of said main panel, and means for fastening said cross members of said flap and main panel to permit angular movement of said flap to a fixed position rearward of said main panel.

4,022,419

MOULD FOR MAKING AND HOLDING WORKING MODELS FOR THE MANUFACTURE OF DENTAL PROSTHESES

Gerd Haker, Holstenstrasse 73, 2000 Hamburg 50, Germany

Filed Aug. 21, 1975, Ser. No. 606,451

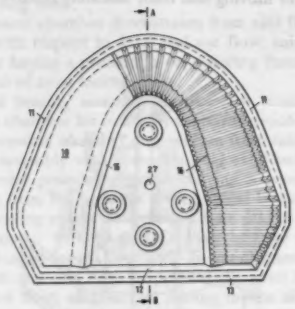
Claims priority, application Germany, Aug. 22, 1974, 2440261

Int. Cl.² A61C *9/00;* **B29C** *1/16*

U.S. Cl. 249—54 **5 Claims**

1. A holder for the manufacture and receipt of a jaw impression working model for manufacturing false teeth, comprising a mould having a base, internally ribbed side walls extending from said base in a broadening manner, and a flange extending outwardly from said broadened walls at the top thereof and retaining elements contoured to the walls of the mould and

removably attached to said flange, said retaining elements being provided with complementary projections at their ends



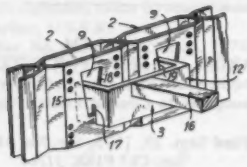
to releasably hook said retaining elements together and hold the working model in position in the mould.

4,022,420

FORMWORK AND CONNECTING MEANS APPARATUS FOR CASTING REINFORCED CONCRETE

Anacleto Pace, 10, via Cadorna, 60100 Ancona, Italy

Filed Nov. 6, 1975, Ser. No. 629,542
Int. Cl.² E04G *9/06, 17/04*
U.S. Cl. 249—194 **7 Claims**



1. Formwork for casting concrete comprising a plurality of flattened tubular elongated elements each having one wall with an outer surface for contacting cast concrete and an opposite wall with aperture means therein, and retainer means disengagably interfitted with at least two of said elongated elements holding the same in assembled juxtaposed relation, said aperture means in each said tubular elongated element being constituted by a series of longitudinal aligned apertures of trapezoidal shape, said retainer means including two flanges with notches therein, said flanges being secured together and engaged in the adjacent apertures of two juxtaposed elongated elements with said notches receiving the walls bounding the apertures.

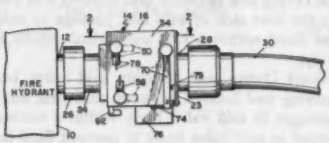
4,022,421

DELAYED RELEASE VALVE FOR A FIRE HYDRANT

Jack M. Carlin, R.F.D. Box 135, Del Mar, Calif. 92014

Filed Dec. 1, 1975, Ser. No. 636,556
Int. Cl.² F16K *31/44*
U.S. Cl. 251—74 **6 Claims**

1. A delayed-release valve for a fire hydrant comprising:
a. a housing defining a self-contained water chamber with an inlet and an outlet;
b. means to connect said inlet to a fire hydrant and said outlet to a fire hose;
c. a movable gate pivotally mounted in said housing at one side of said inlet and movable by water pressure existing at said inlet from a first position sealed against said inlet to a second position clear of said inlet;
d. a second gate hinged to said housing on the side of said inlet opposite the side to which the first-mentioned gate is hinged, said second gate being pivotal between a position free of said first-mentioned gate to a position parallel to and flush against same to hold same in sealed position such that the free end of said first gate is restrained by said second gate primarily near the pivoted end of said second gate whereby said gates together define a leverage multiplier for restraining water pressure;



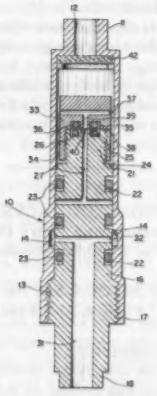
e. means releasably engaging said second gate by the free end of said second gate to hold said second gate in said first position;
f. a control device mounted on said housing to effect releasing of said engaging means to permit the gates to move clear of said inlet.

4,022,422

STEMLESS BANTAM VALVE

Jack P. Stone, Annandale, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 19, 1976, Ser. No. 659,295
Int. Cl.² F16K *47/00*
U.S. Cl. 251—118 **1 Claim**



1. A stemless valve which comprises:
an elongated cylindrical housing with an axis along its length,
said housing including an inlet end and an open end opposite said inlet end with each end coaxially aligned with said housing;
a cylindrical valve body extending into said open end of said housing with its linear axis in coaxial alignment with said housing,
said valve body including an inner end toward said inlet end of said housing and an outer end extending from said open end of said housing;
an axially extending inlet passage in the inner end of said

valve body in coaxial alignment with said housing and extending toward the outer end to a first passage across the diameter of said valve body perpendicular to the axis thereof;

an axially extending outlet passage in said valve body extending from the outer end of said valve body toward said inlet passage in coaxial alignment with said housing to a second passage across the diameter of said valve body perpendicular to the axis thereof with said first and second passages spaced from each other axially along said valve body and parallel with each other;

a first O-ring seal between said housing and said valve body on the inlet side of said first passage in said valve body and fixed within a first cylindrical cutout in said valve body;

a second O-ring seal between said valve body and said housing and located between said first and said second passages in said valve body within a second cylindrical cutout in said valve body to prevent fluid leakage;

a third O-ring seal between said valve body and said housing on the outlet side of said second passage in said valve body and fixed within a third cylindrical cutout in said valve body to prevent fluid leakage,

said housing including opposing cutouts in the inner wall thereof in the area between said second and third O-ring seals within said valve body near said second passage in said valve body;

a threaded cap enclosing the upper end of said inner end of said valve body,

said threaded cap including a passage therein coaxial with said housing and extending from said axially extending inlet passage in said valve body to a passage across the diameter thereof perpendicular to said coaxial passage therein with said coaxially aligned passage opening toward said inlet in said valve body; and

a thin, interchangeable element secured in place between said threaded cap and the inner end of said valve body with said interchangeable element including an orifice therein coaxial with said housing with said orifice aligned with the axial passage in said cap and the inlet passage in the inner end of said valve body,

said interchangeable element controlling fluid flow between said inlet in said housing through said passages in said cap to said inlet passage in said valve body,

whereby said orifice in said interchangeable element and the position of said valve body in an axial position relative to said cutouts in said housing controls fluid flow through said stemless valve.

4,022,423

CONTROL VALVE

Joseph O'Connor, Goshen, and Henry Illing, Parksville, both of N.Y., assignors to Kieley & Mueller, Inc., Middletown, N.Y.

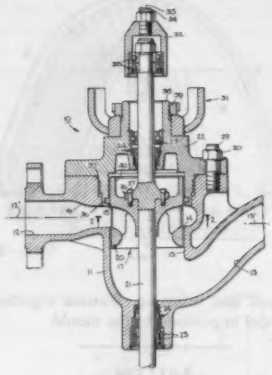
Filed July 30, 1975, Ser. No. 600,563
Int. Cl.² F16K *47/00*; F16L *55/02*
U.S. Cl. 251—127 **7 Claims**

1. A control valve comprising

a housing having an axis and a passageway for a flow of fluid, said passageway having an inlet of predetermined height parallel to said axis, an outlet, a valve seat between said inlet and said outlet, and said passageway having means defining a vane-less scroll-shaped flow path between said inlet and said valve seat for a free flow of fluid through said inlet to said valve seat, said path having a portion of reduced height relative to the height of said inlet and including a transition zone between said inlet and said reduced height portion of said path;

a rotor assembly mounted for rotation about said axis and having a valve seat ring for sealingly seating on said valve seat, a plurality of circumferentially disposed vanes selectively mounted within said scroll-shaped flow path for rotation under the flow of fluid passing therethrough, each said vane having an inlet edge adjacent said reduced height portion, and an annular curvilinear shaped ring adjacent said vanes for guiding a flow of fluid thereover; and

means for moving said rotor assembly relative to said valve



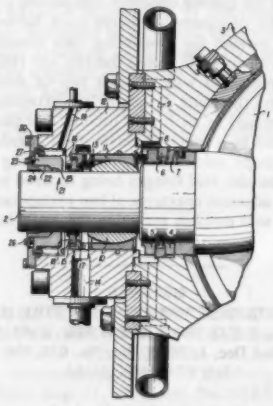
seat between a position in which said valve seat ring is in sealing relation with said valve seat and said vanes are out of the flow path and a position in which said valve seat ring is spaced from said valve seat and said vanes are in the flow path.

4,022,424

SHAFT BEARING AND SEALS FOR BUTTERFLY VALVES

Donald H. Davis, Scotia, and John G. Mossey, Waterford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,818
Int. Cl.² F16K *31/44*
U.S. Cl. 251—214 **7 Claims**



1. A butterfly valve for controlling a fluid flow through a conduit, said butterfly valve comprising a valve casing having a shaft extending through and rotatably mounted within the valve casing; a gate rotatable with said shaft and supported thereby, said gate disposed across said valve casing; and, said shaft supported at each opposite end in a bore formed through said valve casing, said butterfly valve further comprising:

first sealing means disposed within each bore adjacent said valve gate for providing an annular seal between said

shaft and said bore to prevent the axial leakage of controlled fluid out of the valve casing; said first sealing means allowing radial movement of said shaft within said valve casing bore;

a first pressure chamber downstream from said first sealing means with respect to axial leakage flow; said pressure chamber having a pressure level differing from the pressure level of axial leakage flow;

a spherical bearing assembly downstream from said first pressure chamber for rotatably supporting each shaft end;

a second pressure chamber downstream from said spherical bearing assembly with respect to said axial leakage flow; said second pressure chamber having a pressure level differing from the pressure level of axial leakage flow;

a second sealing means downstream from said second pressure chamber with respect to axial leakage flow, said second sealing means providing an annular seal between said shaft and said bore to prevent the axial leakage of controlled fluid; said second sealing means allowing radial movement of said shaft within said valve casing bore;

a third pressure chamber downstream from second sealing means with respect to said axial leakage flow; said third pressure chamber having a pressure level differing from the pressure level of axial leakage flow; and,

a third sealing means downstream from said third pressure chamber with respect to axial leakage flow, said third sealing means providing an annular seal between said shaft and said bore to prevent the axial leakage of controlled fluid out of the valve casing bore.

4,022,425

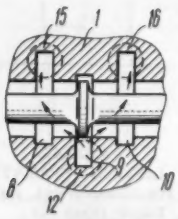
HYDRAULIC CONTROL VALVE

Boris Izrailevich Govzman, prospekt Lenina, 64a, kv. 154, and Ernst Aggeevich Ogloblin, ulitsa Krasnoarmeiskaya 12, kv. 9, both of Kharkov, U.S.S.R.

Continuation of Ser. No. 463,790, April 24, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,353

Int. Cl.² F16K *3/24;* **F15B** *13/042*

U.S. Cl. 251—324 **2 Claims**



1. A hydraulic control valve comprising: a valve body with a through cylindrical bore having an axis; an axially reciprocable spool accommodated in said bore, defining at least two selectable operative positions with respect to said bore; at least two axially spaced circular grooves formed in said bore, having respective shallow and deep portions, and being eccentric to said axis of the bore; spring means for normally urging said spool into a substantially central initial one of said operative positions; at least two passages provided in said valve body, one of said passages being connected to the first of said grooves and being arranged to admit hydraulic fluid to said spool at a fluid inlet leading into and communicating with said deep portion of the respective one groove, and another at least one passage providing a fluid outlet leading from and communicating with said deep portion of the respective other at least one groove, subsequent ones of said deep portions being in said body at opposite sides of said spool; whereby the hydraulic resistance in said shallow portions is over three times greater than that in said deep portions of the grooves, owing to the eccentricity of the latter, resulting in a high-resistance zone in said shallow portions, and the greater hydraulic resistance therein is sufficient to cause the hydraulic fluid to bypass said shallow portions while flowing from said fluid inlet to said fluid outlet communicating with said deep portions.

4,022,426

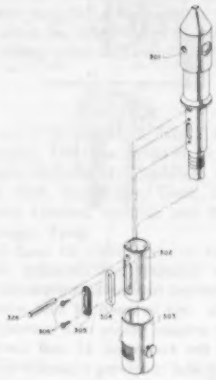
INDEXING VALVE MECHANISM

Norman Weldon Read, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 548,065, Feb. 7, 1975, which is a continuation-in-part of Ser. No. 494,424, Aug. 5, 1974, abandoned. This application Oct. 24, 1975, Ser. No. 625,601

Int. Cl.² F16K *31/00*

U.S. Cl. 251—340 **10 Claims**



1. A valve assembly for use in a rotatable valving mechanism, said valve assembly comprising:

an elongated generally cylindrical mandrel body having a flow bore partially therethrough;

port means through said mandrel body communicating with said flow bore;

a valve sleeve on said mandrel body and having openings through the wall thereof arranged for overlapping said port means;

attachment means for securing said valve sleeve to said body;

loop seal means arranged for snug fitting relationship in said valve sleeve openings against said mandrel body and around said port means;

retention means arranged for sealing engagement in said loop seal means, having flow port means therethrough, and further arranged to retain said seal means in said openings; and,

valve housing means on said valve sleeve adapted for snug rotatable engagement thereon and arranged for sealing engagement with said seal means; said housing means having housing port means through the wall thereof arranged for selective communication with said flow port means.

4,022,427

SLEEVE VALVE MANDREL AND SEAL MEANS FOR INDEXING VALVE ASSEMBLY

Norman Weldon Read, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 494,424, Aug. 5, 1974, abandoned. This application Feb. 7, 1975, Ser. No. 548,065

Int. Cl.² F16K *31/00*

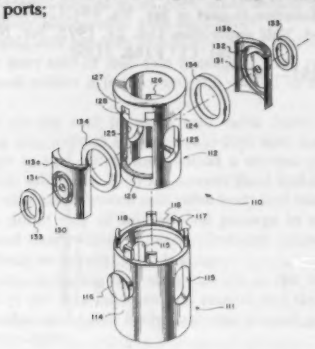
U.S. Cl. 251—343 **3 Claims**

1. A sleeve valve for use over a ported member for alter-

nately opening and closing the ports in the ported member, said sleeve valve comprising:

a generally cylindrical tubular housing adapted to be telescoped over a ported member and having ports through the wall alignable with ports in the ported member;

a ported carrier sleeve slidably telescoped within said housing, having ports aligned with said housing ports, and further having two diametrically opposed windows through the wall thereof angularly displaced from said sleeve ports;



locking means between said housing and said sleeve adapted to prevent rotational movement therebetween;

two seal inserts, one in each of said windows, said seal inserts being arcuate plates with curvature substantially the same as the curvature of said carrier sleeve, said inserts having seal receiving channels on the inside surface thereof arranged to encircle the ports on the ported member; and,

resilient seals in each of said inserts arranged to seat in said receiving channels and abut the ported member and form a fluid-tight seal therebetween.

4,022,428

LIFT DEVICE

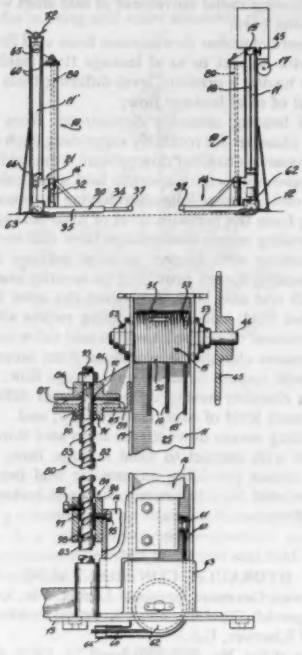
Francois J. Mantha, P.O. Box 129, Evain, Temiscamingue County, Quebec, Canada

Filed Apr. 2, 1976, Ser. No. 672,890

Int. Cl.² B66F 7/12

U.S. Cl. 254—89 R **21 Claims**

1. A lift device comprising a vertical column securable on a support surface, a support frame movably secured along at least a portion of said column, a driveable drum secured in an upper part of said column, a drive assembly including a drive motor coupled to said drum, at least one cable secured to said drum and said support frame and of sufficient strength to displace said support frame and load thereon along said column when said drum is rotated, an elongated bolt supported adjacent said column for free axial rotation, said bolt having a helical thread along at least a portion thereof, and a connector secured to said support frame and is in threaded engagement



with said bolt, said bolt supporting said support frame when said at least one cable fails to support said support frame.

4,022,429

LIFTING APPARATUS

Sukio Yonekura, Higashimurayama, Japan, assignor to Daido Kiko Co., Ltd., Tokyo, Japan

Filed Dec. 19, 1975, Ser. No. 642,466

Claims priority, application Japan, Mar. 13, 1975, 50-30355; Mar. 18, 1975, 50-36352

Int. Cl.² B66F 3/02

U.S. Cl. 254—95 **6 Claims**

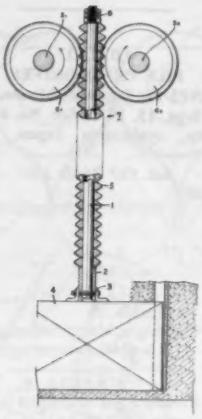
1. A lifting appartus which comprises:

a cone rack mechanism having a cone stem means and a series of cone pieces fitted on said cone stem means;

first and second driving shafts disposed in parallel relation with one another in a casing, each driving shaft having a driving gear interlocked to the cone pieces of the cone rack mechanism; and

an operating handle, axially slidable on a third driving shaft operatively connected to said first and second driving shafts and including first and second threaded shaft portion means, and a non-threaded portion interposed between said threaded portions, for alternatively engaging said threaded portion means so as to operatively drive said driving shafts in alternate directions whereby said shafts will similarly rotate said gears so as to alternatively move said cone stem means in opposite directions as desired for the performance of a driven ascending or descending operation of said lifting apparatus, and for

engaging said non-threaded portion so as to drivingly disengage said third driving shaft from said first and second driving shafts whereby said cone stem means and said lifting apparatus descend under its own weight.

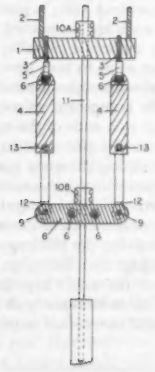


4,022,430

SUCKER ROD ADJUSTMENT TOOL

Donald Wayne Felder, 837 Hillside Drive; Ralph Felder, 1609 S. Vaden, both of Sherman, Tex. 75090, and Orville Monroe, 2641 E. 59th St., Tulsa, Okla. 74145

Filed Aug. 19, 1976, Ser. No. 715,931
Int. Cl.² B66F 1/00
U.S. Cl. 254—106 3 Claims



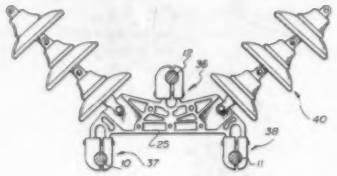
1. A sucker rod adjustment tool comprised of two cable type suspension slings, with two bolts and nuts two hydraulic servos, a lifting collar base, a lifting collar cap, with two bolts with nuts and two pins with retaining clips; said slings each being of equal and sufficient length as to allow ample room to attach a hydraulic servo when the said sling is draped across the sucker rod support member, said sling forming a loop, the said sling having a swaged eye type fitting at each end for the purpose of attaching a hydraulic servo by passing a bolt through one end fitting eye of the said sling, through the base pivot eye of the said hydraulic servo, through the opposited end eye fitting of the said sling, said assembly being retained in such an arrangement by a nut on the said bolt, the said slings thus suspend and support the said hydraulic servos below the sucker rod support member; the said hydraulic servos having attached to the rod end eyes a lifting collar base and lifting collar cap by means of a pin and retaining clip, said pin passing first through the lifting collar base, through the piston rod eye and through the lifting collar cap, said lifting collar base having two protrusions near its center, on the inner face, said protrusions being of ample dimensions and having sufficient separation as to allow various size of sucker rod to be unencumbered when passed between the said protrusions, the said lifting collar cap forming a four sided enclosure between the said base and two protrusions when firmly secured in place by two bolts passing through the said base at a point to be outboard the center of each protrusion, the said cap having like holes communicating with the said bolt holes through the said base, a conventional sucker rod clamp installed around the sucker rod above the said lifting collar base and said lifting collar cap for the purpose of transmitting the lifting force to the sucker rod when the retraction of the said hydraulic servos raises the said lifting collar and cap.

4,022,431

METHODS OF STRINGING BUNDLE CONDUCTORS

Herbert J. Houston, Oakville; Kenneth D. Bolt, Burlington, both of Canada; William H. Chadwick, Jr., Rossville, Ga., and Tracy R. Hall, East Ridge, Tenn., assignors to Slater Steel Industries Limited, Canada and Sherman & Reilly, Inc., Chattanooga, Tenn.

Filed June 18, 1976, Ser. No. 697,482
Int. Cl.² E21C 29/16
U.S. Cl. 254—134.3 PA 14 Claims



1. In a method of stringing a bundle of sub-conductors from a suspension bracket suspended by insulator strings each extending from a supporting structure to a suspension bracket, the improvement comprising the steps of;

securing a temporary connector device along at least a part of one of said insulator strings to provide a temporary suspension connection through a portion of said one insulator string and said temporary connector device;

disconnecting said one insulator string to provide a gap for passage of one of said sub-conductors, said temporary connector device serving to maintain a said temporary suspension connection across said gap;

raising said one of said conductors through said gap past said one insulator string;

reconnecting said one insulator string to close said gap;

removing said temporary connector device; and securing said one conductor to said suspension bracket.

4,022,432

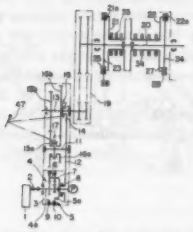
POWER TRANSMISSION IN DOUBLE-DRUM WINCH

Akihiro Toyomura; Yutaka Sugimoto, both of Hirakata, and Ryoji Shiota, Katano, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,516
Int. Cl.² B66D 1/26
U.S. Cl. 254—185 B 3 Claims

1. Double-drum winch having a power source, a transmission with its input shaft connected to said power source and having a forward driving connection clutch, a reverse driving connection clutch and speed changing clutch means so that an

output shaft of said transmission can be selectively driven in either of the forward and the reverse direction at selected one of various speeds, a drum shaft operatively connected to the output shaft of said transmission so as to be driven thereby, a hook-drum rotatably supported on said drum shaft and having a hook wire wound therearound for actuating a hook connected thereto by the rotation of said hook drum, a boom drum rotatably supported on said drum shaft and having a boom drum wound therearound for actuating a boom connected thereto by the rotation of said boom drum, wherein the improvement comprises a forward driving planetary gear system arranged in said transmission around said input shaft thereof and engageable with said forward driving connection clutch so as to drive said output shaft in the forward direction when engaged, a reverse driving planetary gear system arranged in said transmission around said input shaft and engageable with said reverse driving connection clutch so as to drive said output shaft in the reverse direction, a plurality of reduction gear sets arranged in said transmission and engageable with said speed changing clutch means, a hydraulically operated hook clutch engageable with said hook drum so as to drive the same together with said drum shaft, a hydraulically operated hook brake engageable with said hook drum so as to arrest the rotation of said hook drum, a hydraulically operated boom clutch engageble with said boom clutch so as to drive the same together with said drum shaft, a hydraulically operable boom brake engageable with said boom drum so as to arrest the rotation of said boom drum, a first hydraulic control system having a hook clutch actuating valve connected to said hook clutch, a hook brake actuating valve connected to said



hook brake, a forward driving connection clutch actuating valve connected to said forward driving connection clutch and a reverse driving connection clutch actuating valve connected to said reverse driving connection clutch, a first manually operable means operably connected to said hook clutch actuating valve, said hook brake actuating valve, said forward driving connection clutch actuating valve and said reverse driving connection clutch actuating valve so as to selectively position the respective valves connected thereto upon selected manipulation of said first manually operable means thereby effecting selected operation of said hook, a second hydraulic control system having a boom clutch actuating valve connected to said boom clutch, said forward driving connection clutch actuating valve, said reverse driving connection clutch actuating valve and a boom brake actuating valve connected to said boom brake, a second manually operable means operably connected to said boom clutch actuating valve, said forward driving connection clutch actuating valve, said reverse driving connection clutch actuating valve and said boom brake actuating valve so as to selectively position the respective valves connected thereto upon selected manipulation of said second manually operable means thereby effecting selected operation of said boom and a third manually operable means operably connected to said speed changing clutch means so as to selectively change the speed of the output of said transmission by the selected operation of said third manually operable means, thereby permitting said hook and said boom to be operated at a selected speed in any of the various modes of operations of said winch by selected operation of any one or more of said first to three manually operable means.

4,022,433

PILE PRESS DRIVER

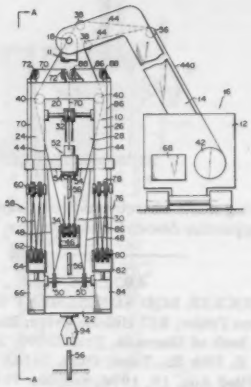
Yoshizi Kondo, 2923-11, Togasaki, Misato, Saitama, Japan

Filed Sept. 15, 1975, Ser. No. 613,345

Claims priority, application Japan, Sept. 24, 1974, 49-108843

Int. Cl.² B66D *3/04*

U.S. Cl. 254—188 **10 Claims**



1. A pile press driver for forcefully driving a pile into the ground which comprises: a leader; support means for suspending the leader; a composite sheave device carried on the leader and having an output side; a plurality of output wire ropes whose one side ends are connected to the output side of the composite sheave device; a plurality of reversion means mounted on the leader so as to turn upward the one side end portions of the output wire ropes extending downward from the output side of the composite sheave device; a pile cap connected to the other side ends of the output wire ropes and mountable on the head of a pile so as to supply the pile with a uniform downward acting pressure resulting from the tension of the entire output wire ropes caused by pulling upward the one side end portions of the output wire ropes through operation of the composite sheave device; pile cap elevator means for vertically moving the pile cap carried on the leader so as to selectively engage and disengage the pile cap with the pile; and drive means for uniformly driving the composite sheave device so as to continuously drive the pile into the ground by the aforesaid downward acting pressure.

4,022,434

TIRE FENCE

Phil D. Moore, P.O. Box 309, The Dalles, Oreg. 97058

Filed Feb. 9, 1976, Ser. No. 656,369

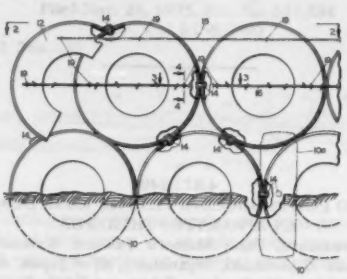
Int. Cl.² E01F *13/00*

U.S. Cl. 256—1 **9 Claims**

1. A tire fence comprising

a. a plurality of pneumatic tire casings disposed vertically in a single vertical plane with their axes extending normal to said plane and with their axes aligned in common planes while being also located in spaced parallel planes and staggered vertically with each other and also arranged in contiguous relation with each other to provide a plurality of superimposed substantially coplanar courses,

b. supporting means supporting the bottom course in substantially vertical position, and



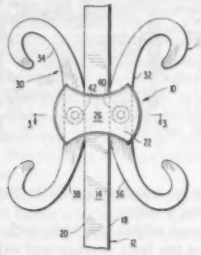
c. casing fastening means in said vertical plane fastening the contiguous casings to each other.

4,022,435

MOLDED SCROLL DESIGNS FOR FENCE STRUCTURE

Carl R. Glass, Rte. 1, Box 59, P-1, Kissimmee, Fla. 32741

Filed Apr. 16, 1976, Ser. No. 677,454
Int. Cl.² E04H *17/00*
U.S. Cl. 256—1 6 Claims



1. A decorative scroll for a fence having at least one vertical post with a front and a back side and of a depth from side to side, the scroll comprising:

a face plate having interior and exterior sides, and being of a width exceeding the width of the post and of a height from top to bottom adjacent the post;

a pair of laterally spaced scroll members secured on the interior side of the face plate, said scroll members having proximal surfaces which approach one another at opposing flat sections, said flat sections being of depths at least equal to the depth of the post and of heights approximately equal to the height of said face plate adjacent to the post, whereby said flat sections are adapted to frictionally grip the post therebetween;

the scroll members having inside walls; and

means on the inside walls of the scroll members for engaging the back side of the post and for drawing the interior side of said face plate against the post.

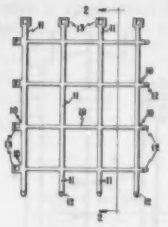
4,022,436

SECTIONAL SUPPORT FENCE

Ramon L. Thomas, 1007 Menlo, Sioux Falls, S. Dak. 57105

Filed Jan. 19, 1976, Ser. No. 650,550
Int. Cl.² E04H *17/16*
U.S. Cl. 256—24 4 Claims

1. A piece of fence comprising a fence section of substantially rectangular shape having a top and bottom edge and two lateral ends, said section having a plurality of bars extending from said top and bottom edges and from said lateral ends, complementary mating parts being formed on said bars so that one of said parts is in one end of a bar and the mating part is on the end of the bar opposite to this first-named bar whereby said section can be formed into a cylindrical form by connecting said mating parts together and can also be connected on all four sides to an added section of similar form.

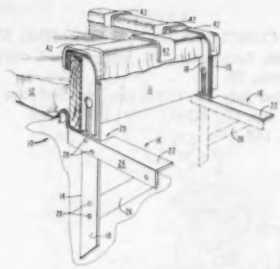


4,022,437

BATTER-BOARD SUPPORT

Raymond L. French, 108 Bow St., Lexington, Mass. 02173

Filed Jan. 12, 1976, Ser. No. 648,181
Int. Cl.² E04H *17/16*
U.S. Cl. 256—26 9 Claims



1. A support for a skating rink batter-board including:

a. a vertical fluke adapted to be fixed in a base medium around the perimeter of a skating surface,

b. a horizontal arm attached to said vertical fluke,

c. a tab spaced from said fluke and extending up vertically from said horizontal arm, said tab and fluke forming the sidewalls, and said arm forming the bottom wall of a slot for receiving a batter-board and securing it in place around the perimeter of the skating surface.

4,022,438

STIRRING APPARATUS

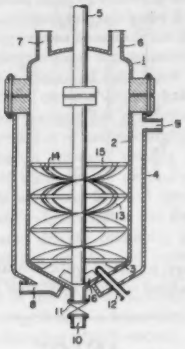
Nobuyuki Shishido, Yokohama; Kazutami Muramatsu, Tokyo; Kikuo Moriya, Yokohama, and Seiti Yasuda, Yamato, all of Japan, assignors to Mitsubishi Kasei Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1975, Ser. No. 575,796
Claims priority, application Japan, May 13, 1974, 49-52976
Int. Cl.² B01F *7/16*
U.S. Cl. 259—107 2 Claims

1. In a stirring apparatus of the helical ribbon type of the class comprising a tank, a rotary shaft vertically disposed in said tank, and a plurality of helical ribbon type impeller blades mounted on said rotary shaft, the improvement wherein:

the ratio of the width of each impeller blade to the diameter of the impeller is made to be from 1.5/10 to 3/10 and the impeller blade has defined therein one or more openings having an opening ratio expressed by a relation $0.59/3\ \sqrt{D} <$ opening ratio $< 2.28/3\ \sqrt{D}$, where D represents the diameter of the impeller and the opening

ratio is the ratio of the area of the opening to the total area of a helical ribbon type blade containing said opening, and



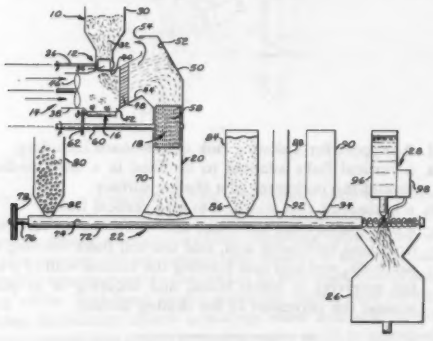
said openings take the form of a slot extending in the direction of the length of the ribbon shaped blade.

4,022,439

FIBROUS CONCRETE BATCH FORMING SYSTEM

Steven L. Groth, Armington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 11, 1975, Ser. No. 595,204
Int. Cl.² B28C 7/04; B07B 7/00
U.S. Cl. 259—165 **1 Claim**



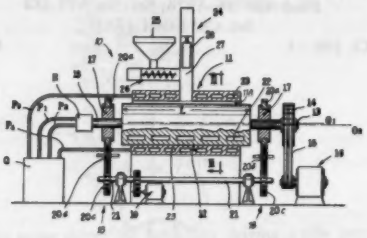
1. In a concrete batch forming system including conveying means for introducing concrete ingredients in solid form into a mixer or the like, means for apportioning large aggregate onto said conveying means,. means for apportioning cement onto said conveying means, means for apportioning sand onto said conveying means, means for apportioning fibrous reinforcing material onto said conveying means, the improvement comprising, means for providing a source of fibrous reinforcing material, means for separating fibrous reinforcing material from said source into (a) balls of fiber and (b) substantially individual fibers; means for directing only substantially individual fibers from said separating means to said fibrous reinforcing material apportioning means, said separating means comprising an air classifier including a housing having an upper, fibrous reinforcing material inlet, a lower fiber ball outlet, a side individual fiber outlet, and means for directing air across the interior of said housing toward said side outlet; and louvers associated with said side outlet for directing entrained fibers in a predetermined path, and means downstream of said louvers defining an impact surface positioned in said path to be struck by entrained fibers to break up small groups of fibers passing through said side outlet.

4,022,440

METHOD FOR PRODUCING PLASTIC COMPOUND AND AN APPARATUS THEREFOR

Yuzo Kawamura, Otsu; Mamoru Takiura, Kawasaki, and Yoshihiro Hayashizaki, Sagamihara, all of Japan, assignors to Ikegai Iron Works, Ltd., Tokyo and Yugen-Kaisha Idea Research, both of, Japan

Filed Feb. 19, 1975, Ser. No. 551,064
Claims priority, application Japan, Feb. 21, 1974, 49-20746; Feb. 26, 1974, 49-21937
Int. Cl.² B29B 1/08, 1/10
U.S. Cl. 259—192 **22 Claims**



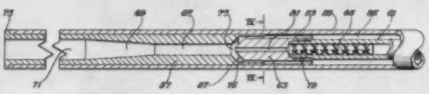
1. An apparatus for producing plastic material, comprising:
a. a barrel having a bore;
b. a rotor disposed within the bore with a radial clearance between it and the bore surface and with its axis eccentrically positioned relative to the bore axis so that there is at least one point around the circumference of the bore where the radial clearance is less than at the remaining points around the circumference;
c. feeding means for feeding plastic material under pressure into the radial clearance between the rotor and the bore surface;
d. rotor rotating means for rotating the rotor about its axis; and
e. revolving means for revolving the rotor axis about the bore axis so that the point of minimum radial clearance between the rotor and the bore surface continuously advances around the bore circumference.

12. An apparatus for producing plastic compound, comprising:
a. a barrel having a bore;
b. a rotor having a flexible annular wall disposed substantially coaxially within the bore and with a radial clearance between it and the bore surface;
c. feeding means for feeding plastic material under pressure into the radial clearance between the rotor and the bore surface;
d. rotating means for rotating the rotor about its axis;
e. deforming means within the flexible annular wall for deforming the wall radially outward at at least two circumferentially spaced positions to create points where the radial clearance between the annular wall and the bore surface is at a minimum; and
f. advancing means for rotating the deforming means to advance the points of minimum radial clearance around the bore circumference.

4,022,441
UNIVERSAL TORCH

Larry R. Turney, Denton, Tex., assignor to Victor Equipment Company, Denton, Tex.

Filed Nov. 28, 1975, Ser. No. 635,854
Int. Cl.² B23K 7/00
U.S. Cl. 266—48 4 Claims



1. A cutting torch that can employ any of the gaseous welding fluids at pressures as low as eight ounces per square inch without sustained burning on flashback comprising:

a. a torch head;

b. a torch tip connected in fluid tight relationship with said torch head;

c. a body having a fuel inlet passageway and an oxygen inlet passageway;

d. a fuel flow control valve sealingly connected with said fuel inlet passageway;

e. an oxygen flow control valve sealingly connected with said oxygen inlet passageway;

f. a cutting oxygen passageway connected with said oxygen inlet passageway upstream of said oxygen flow control valve;

g. a cutting oxygen flow control valve connected with said oxygen inlet passageway;

h. a cutting oxygen tube assembly sealingly connected with said cutting oxygen flow control valve; and

i. a pre-heat tube assembly that includes:

a diffuser section adjacent the end of said pre-heat tube assembly nearest said torch head; said diffuser section having at least one substantially cylindrical bore and connected therewith a frusto-conical bore that flares downstream;

an outer tube section for passage of the fuel; said outer tube section being connected in fluid tight relationship with said fuel inlet passageway and said fuel flow control valve;

an inner tube section for passage of the oxygen with which to admix and burn said fuel; said inner tube section being disposed within said outer tube section and connected at its first end in fluid tight relationship with said oxygen inlet passageway and said oxygen flow control valve so as to transmit via its interior said oxygen alone to a mixer where it will be admixed with said fuel, and define an annular passageway thereabout for said fuel alone to said mixer;

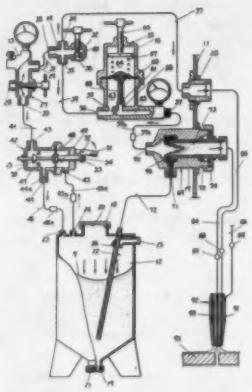
a mixer disposed within a surrounding tube member in communication with said diffuser and the annular passageway defined thereby; said mixer being connected with the second end of said inner tube section; said mixer having a mixer orifice extending longitudinally thereof for passing the relatively high pressure oxygen therefrom in a high speed jet for aspirating a low pressure fuel into admixture therewith in said diffuser; said mixer orifice being disposed downstream of said oxygen flow control valve and a spiral and having a length greater than four times its diameter for minimizing turbulence and forming an aspirating high speed jet that enables use of the torch with a plurality of fuels at a plurality of pressures; said mixer having at its free end an internal frusto-conical section that flares upstream for deflecting a detonation wave outwardly into said annular passageway disposed thereabout for said fuel; and

a spiral disposed within said inner tube section downstream of said oxygen flow control valve and adjacent and upstream of said mixer and said mixer orifice; said spiral being of a highly heat conductive material for conducting heat away from any portion of a combustion wave flashed thereinto to extinguish the combustion, being cooled by a flow of oxygen therepast and being operable in conjunction with said mixer to prevent sustained burning from a flashback that occurs in said torch.

4,022,442
WELDING AND CUTTING APPARATUS

Seiichi Okui, 581,1380-banchi Hattorigawa, Yoa, Osaka, Japan

Filed June 13, 1975, Ser. No. 586,811
Int. Cl.² B23K 7/08
U.S. Cl. 266—75 2 Claims

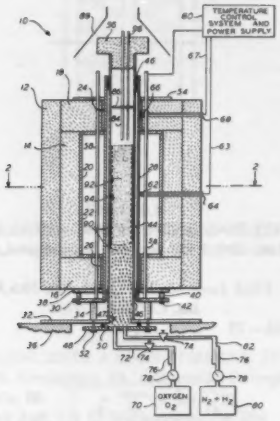


1. An apparatus for use with a welding or cutting nozzle in welding or cutting equipment, said nozzle having three inlets for gases or metallic flux powder, one of the inlets in the nozzle being adapted for connection to a source of combustible welding gas, said apparatus being adapted for connection between an oxygen source and the nozzle and having three oxygen paths, a first oxygen path being for connection of oxygen to the nozzle at a second of said inlets in the nozzle, a second oxygen path including a pressure regulating valve and a metallic flux powder regulating valve where pressure regulated oxygen is mixed with the powder, the third oxygen path being connected in parallel with the said second path and including a chamber for the powder which is pressured by the oxygen to move the powder to the metallic flux powder regulating valve so that it can be mixed with the oxygen from said second path and fed to a third of said inlets of the nozzle, and backfire means comprising a housing and passageway means therethrough for passing the oxygen and metallic powder to the third inlet of the nozzle, said passageway having a heat fusible seal which in the event of backfire can melt and allow air to enter the chamber.

4,022,443
APPARATUS FOR THE CONCENTRATION AND RECOVERY OF PLATINUM FAMILY METALS FROM CERAMIC MATERIALS

Roger Francis Belt, Morristown, N.J.; Richard Charles Puttbach, Santa Rosa, Calif., and Christopher Thomas Schreiber, Parsippany, N.J., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Dec. 24, 1975, Ser. No. 644,028
Int. Cl.² C22B *61/00*
U.S. Cl. 266—148 **13 Claims**



1. Apparatus for concentrating and recovering platinum family metals from ceramic material, comprising:

a furnace having a central tube inert under conditions of heat to ceramic material for receiving said ceramic material bearing said platinum family metals;

means for heating said tube and said ceramic material contained therein in a hot zone;

means for partially closing said tube located in a zone removed from said means for heating to establish a cold zone;

means connected to said tube for flowing an oxidizing gas through said tube and through said hot zone to generate volatile oxides of said platinum family metals which are carried to said means for partially closing said tube in said cold zone and deposited there by said flowing gas; and

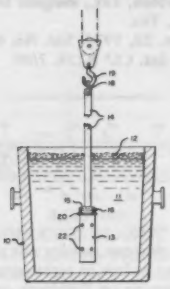
means connected to said tube for flowing a reducing gas through said tube and said hot and cold zones, respectively, after said volatile oxides are deposited on said means for partially closing said tube and while said furnace is cooled for reducing said oxides to said platinum family metals.

4,022,444
APPARATUS FOR ADDING MISCHMETAL TO MOLTEN STEEL

Joseph R. Jackman, West Pittsburgh, Pa., assignor to Reactive Metals & Alloys Corporation, West Pittsburgh, Pa.

Filed Aug. 25, 1975, Ser. No. 607,625
Int. Cl.² C21C *7/00*
U.S. Cl. 266—216 **3 Claims**

1. A canister for adding rare earths to steel comprising an elongated metal shell having a top attaching means for an inserting rod or bloom, a central lengthwise rod in said shell, a plurality of radial fingers on said rod and a mischmetal-magnesium alloy consisting essentially of about 1% to 2.5% magnesium and the balance mischmetal with ordinary impurities

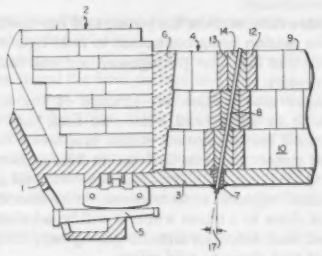


cast in and filling said shell and attached to said central rod and fingers.

4,022,445
CONVERTER BOTTOM STRUCTURE

Wilhelm Langenfeld, Dusseldorf, and Klaus Stelzner, Duisburg, both of Germany, assignors to Didier-Werke AG, Wiesbaden, Germany

Filed Apr. 30, 1976, Ser. No. 682,175
Claims priority, application Germany, May 17, 1975, 2522036
Int. Cl.² C21C *5/48*
U.S. Cl. 266—224 **10 Claims**



1. A converter bottom structure comprising:

a planar refractory bottom lining;

at least one decarburization nozzle extending through said lining at an angle inclined to the plane thereof; and

said lining comprising:

at least one layer of solid bottom bricks assembled in a desired planar pattern, with a gap in said layer where said nozzle extends therethrough;

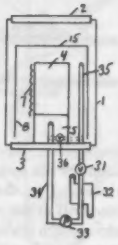
a perforate outer brick positioned in said gap and surrounding said nozzle, said outer brick having outer surfaces extending transverse to said plane of said lining and contacting complementary surfaces of said layer defining said gap, said outer brick having a hole therethrough extending perpendicular to said plane of said lining; and

an inner brick having an exterior configuration to fit within said hole in said outer brick in contact therewith, said inner brick having therethrough a bore inclined to said plane of said lining at the same angle as said nozzle, said nozzle extending through said bore in said inner brick in contact therewith.

4,022,446
QUENCHING IN HOT GAS ISOSTATIC PRESSURE FURNACE

Charles W. Smith, Jr., Fairview, and Franz X. Zimmerman, Erie, both of Pa., assignors to Autoclave Engineers, Inc., Erie, Pa.

Filed Oct. 23, 1975, Ser. No. 624,786
The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.
Int. Cl.² C21D 1/74
U.S. Cl. 266—252 13 Claims

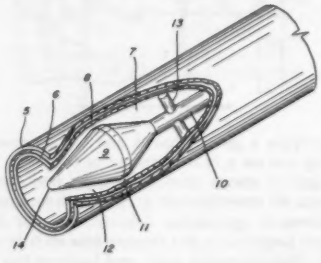


1. A furnace for hot gas isostatic pressing, diffusion bonding and the like comprising a pressure vessel having means for holding gas at high pressure, said vessel having tubular side walls 1 with a top closure and a bottom closure, means for creating a work receiving hot zone in the upper part of the vessel and a cool zone in the lower part of the vessel, means for creating a path for withdrawing gas from the hot zone through a cooling heat exchange means and returning the gas to the cool zone, means for blocking flow of gas in said path, and means for unblocking flow in said path to permit rapid circulation of the gas in said path and the resultant cooling of work in said hot zone.

4,022,447
SUPERSONIC NOZZLE FOR SUBMERGED TUYERE OXYGEN STEELMAKING PROCESS

David K. Griffiths, Penn Hills Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Feb. 23, 1976, Ser. No. 660,567
Int. Cl.² C21C 5/48
U.S. Cl. 266—266 4 Claims



1. In a tuyere, having a central straight bore for the injection of refining gases into molten metal, said tuyere being adapted for submerged blowing, wherein during refining, the egress end of said bore contacts the molten metal,

the improvement which comprises, a generally conoidal insert member supported in an approximately axial position within, but not contiguous to the surface of said bore, in which (i) the base portion of the conoid is located upstream of the tapered portion thereof, and (ii) the downstream end of said insert member lies approximately in the plane formed by the egress end of the tuyere whereby the cross-sectional area of the annular passageway formed by the surface of the bore and the outer surface of said conoid exhibits a minimum at the base portion and increases in the direction of travel of said refining gases, said cross-sectional area being measured in a plane perpendicular to the bore axis,

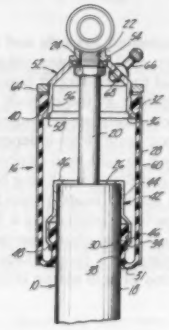
positioning means for moving said insert member in an axial direction within said bore,

support means, located upstream of said base member, for maintaining the insert member in said approximately axial position.

4,022,448
VEHICLE SUSPENSION UNIT AND METHOD OF ASSEMBLY THEREOF

Lehan James Reeder, 4880 Haddington, Bloomfield Hills, Mich. 48013

Filed Dec. 5, 1975, Ser. No. 637,854
Int. Cl.² F16F 9/08
U.S. Cl. 267—8 R 20 Claims



1. In a supplementary air spring unit for a shock absorber assembly having a body with a circular cylindrical end portion and an end face adjacent thereto, a piston rod projecting through the end face and carrying an attachment portion at one end thereof, the combination of a resilient tubular rolling-lobe boot having first and second beads at the respective ends thereof, means for securing said first bead to the circular cylindrical end portion of the shock absorber body, a master cap mountable on the piston rod and securable thereon by the attachment portion, said cap having a skirt portion including a lip extending outwardly from said skirt, means for securing said second bead in sealing egagement with said lip comprising fastening means directly engaging said cap in spaced proximity to said second bead, and a shell surrounding portions of said boot and having an inwardly directed lip trapped between and engaging each of said second bead and said fastening means, said fastening means securing said shell to said cap, and means for selectively introducing fluid under pressure to the cavity within said boot.

4,022,449
LEAF SPRING

Eckart v. Estorff, Werdohl, Germany, assignor to Stahlwerke Bruninghaus GmbH, Werdohl, Westfalen, Germany

Filed Apr. 26, 1974, Ser. No. 464,623
Claims priority, application Germany, Apr. 26, 1973, 2321190
Int. Cl.² F16F 1/18
U.S. Cl. 267—48 19 Claims

1. In a parabolic leaf spring including a plurality of stacked spring leaves connected to one another at least indirectly at the spring ends to form pairs of contacting friction surfaces

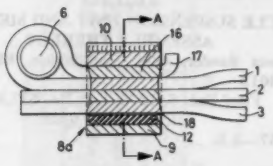
between which load-dependent normal friction forces are generated during spring action, the improvement comprising:

a. a rigid clamping yoke of closed cross section provided at the ends of the parabolic leaf spring and surrounding at least two of the stacked spring leaves; said rigid clamping yoke including

1. a generally U-shaped clamp having spaced legs and a bottom;

2. a transverse bar rigidly affixed to said clamp and bridging said legs at a distance from said bottom;

b. a rubber-elastic pad disposed within said clamping yoke and having opposite first and second faces, at least said



first face being oriented towards and adjacent to one of said spring leaves; said clamping yoke compressing said rubber-elastic pad for pressing at least two of said spring leaves to one another at the ends of the parabolic leaf spring with an accurately predetermined, load-independent, normal force; said load-independent force being applied in addition to said load-dependent force; and

c. first and second metal surfaces being bonded face-to-face to said first and second faces, respectively, of said pad, said first metal surface constituting a first face of a metal plate member; said metal plate member having a second, opposite face being in a face-to-face frictional engagement with said one of said spring leaves.

4,022,450

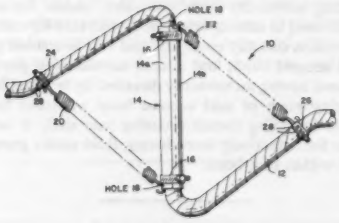
LINE TENSIONING DEVICE

Barry E. Smith, Jr., 6623 Sheridan St., Hollywood, Fla. 33024

Filed Apr. 14, 1976, Ser. No. 677,029

Int. Cl.² B63B *21/00*; F16F *1/12*

U.S. Cl. 267—73 **4 Claims**



1. A device for maintaining a resilient sinuous bend in an elongated flexible line comprising: an elongated rigid member secured along a portion of said line throughout the length of said member; said member having first and second opposite ends; a first elongated spring secured at one end of said first spring to the first end of said member and secured at the other end of said first spring to a point on said line spaced away from said second end; and a second elongated spring secured at one end of said second spring to the second end of said member and secured at the other end of said second spring to a point on said line spaced away from said first end.

4,022,451

IMPACT DAMPING SYSTEM AND SUSPENSION THEREFOR

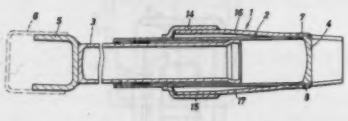
Gerhard Voigt, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Aug. 20, 1975, Ser. No. 606,335

Claims priority, application Germany, Aug. 24, 1974, 2440694

Int. Cl.² B61G *11/12*; B60R *19/02*

U.S. Cl. 267—116 **3 Claims**



1. An impact damping system, having a telescoping shock absorber and a suspension for the system, said shock absorber comprising a cylinder welded to the suspension and being open at one end and closed off at the other end by an end wall, and a displacement piston which slides in telescope-fashion in the cylinder through its open end, said piston having a portion thereof extending from the cylinder, an impact receiving means being rigidly attached to the extending portion of the piston, said impact damping system being characterized in that the suspension for the system comprising a single cut metal plate having a posterior section located in the vicinity of the end wall of the cylinder and an anterior section located at a distance from the end wall along the cylinder in the direction toward the open end of the cylinder, said posterior section of the metal plate being bent into a U-shaped cross section with a base and two legs, the legs of the U-shaped cross section conforming to and being welded to the cylinder only in the region of its end wall so as to rigidly locate the cylinder, the anterior section being in the form of a continuation of the base of the U-shaped posterior section and being bent into a plane substantially perpendicular to the direction of the cylinder axis and the base of the posterior section, said anterior section defining a flanged hole, that matches the diameter of the cylinder, in which said cylinder is press fit and rigidly located.

4,022,452

POLE GUARD

Herman K. Dupre, Seven Springs, Champion, Pa. 15622

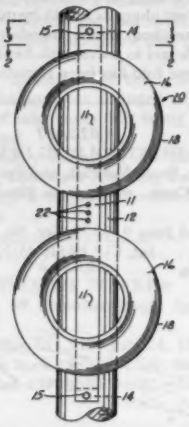
Filed July 22, 1976, Ser. No. 707,818

Int. Cl.² F16F *7/12*

U.S. Cl. 267—140 **8 Claims**

1. A pole guard comprising a substantially rigid strip secured longitudinally to a pole and in spaced relation thereto, at least one used vehicle tire larger in diameter than the pole

and having diametrically opposed slots in the perimetal annular face of said tire, said slots being adjacent one side face of



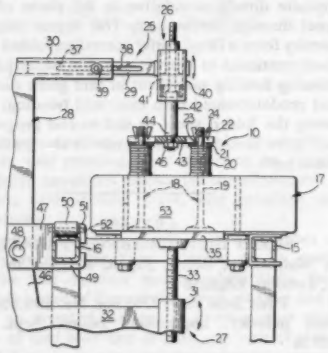
said tire and slidably receiving said strip therethrough with said one side face facing said pole.

4,022,453

CLAMP FOR ENGINE HEAD SERVICE TEST BENCH

Virgil R. C. Durgan, Tremont, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 28, 1976, Ser. No. 700,243
Int. Cl.² B25B *1/24*
U.S. Cl. 269—71 **8 Claims**



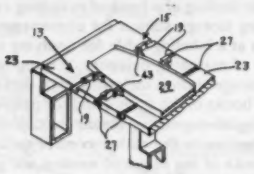
1. In a service and test bench having a support rail for supporting apparatus to be serviced in a service space adjacent said rail, and adjustable clamp means having opposed clamping portions for clamping therebetween the apparatus to be serviced, the improvement comprising: mounting means movably carried on said support rail; a C-shaped carrier having a bight and opposed legs; pivot means pivotally mounting said carrier bight to said mounting means adjacent said rail, one of said carrier legs carrying one of said clamping portions and the other of said carrier legs being provided with extensible connecting means for carrying the other of said clamping portions for relatively positioning the clamping portions in a direction perpendicular to the clamping direction, movement of said mounting means on said rail causing selective positioning of said clamp means with said clamping portions at any one of a plurality of opposed portions of said service space; means for adjusting the spacing of said one clamping portion from the other clamping portion in a clamping direction; and means for selectively adjusting the extensible connecting means to adjacent the positioning of said one clamping portion relative to the other clamping portion in a direction transverse to said clamping direction.

4,022,454

UNIVERSAL SELF-ALIGNING LOCATOR

Martin Bredvik, Mercer Island, Wash., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,529
Int. Cl.² B25B *1/20*
U.S. Cl. 269—100 **3 Claims**



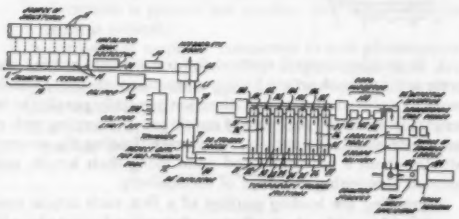
1. A universal self-aligning locator clamp for supporting a workpiece including a plurality of parts on a machine bed during assembly, said locator clamp comprising, in combination, a support member having a flat bottom base leg, an upright leg extending upward from one end of said base leg, a side extension on one side of the upper portion of said upright leg, and an angle member pivotably attached to the side extension on said support member; and means for removably attaching said support member to the machine bed, thereby permitting substantially universal movement of said locator clamp relative to the workpiece positioned on the machine bed.

4,022,455

DEMOGRAPHIC ASSEMBLING AND ADDRESSING MACHINE FOR MAGAZINES AND THE LIKE

John R. Newsome, Shumway; Kenneth Polarek, Effingham, and Frederick F. Nasser, Teutopolis, all of Ill., assignors to World Color Press, Inc., Maryland Heights, Mo.

Filed Dec. 31, 1975, Ser. No. 645,875
Int. Cl.² B65H *39/02*
U.S. Cl. 270—54 **14 Claims**



1. In an assembling and addressing machine for magazines and the like published in a predetermined plurality of versions corresponding to demographic categories, the combination comprising means for producing a plurality of printed signatures capable upon selection in predetermined combinations of accommodating all of the versions, a gathering device for gathering the selected signatures, gather control means including a matrix for directing the gathering device to select signatures in the predetermined combinations to form a book in any of the versions, binding and trimming means for finishing the gathered book, a storage assembly including a plurality of storage stations each temporarily storing a supply of one version of the finished books corresponding to the respective

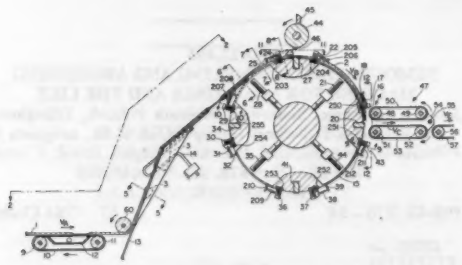
demographic category, each storage station having an input and an output, an input conveyor for conveying books from the gathering device to the storage assembly, means including diverters controlled by the gather control means for depositing each book produced by the gathering device at the input of the respective storage station, a labeling table, an output conveyor for conveying books from the storage assembly to the labeling table, dispensing means at the output of each storage station for feeding of a book therefrom to the output conveyor, a source of address labels at the labeling table, said labels having the address and coded indication of the demographic category of the recipient, means for effectively reading each label to determine its demographic category, means responsive to the reading means for triggering the dispensing means for the feeding of a book of matching category from the corresponding storage station for conveyance to the labeling table, means at a labeling table for applying the address label to the book of matching category, sensing means associated with each storage station including limit detectors for sensing depletion of books in the station and for producing a depletion signal, and signal-responsive means for controllingly coupling the limit detectors to the gather control means so that a new supply of books of the required version are gathered, bound, trimmed, and deposited in the depleted station to replenish the same.

4,022,456

METHOD AND APPARATUS FOR FOLDING AND CUTTING AN INTERCONNECTED WEB OF DISPOSABLE DIAPERS OR THE LIKE HAVING STRETCHED ELASTIC LEG BANDS SECURED THERETO

Leonard C. Hooper, Cincinnati, and Gerald M. Weber, Loveland, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed July 11, 1975, Ser. No. 595,477
Int. Cl.² B65H *45/16*
U.S. Cl. 270—65 **22 Claims**



1. A positive control method for transversely cutting discrete articles, each article having at least one stretched elastic member secured thereto in a direction generally parallel to its length, from an interconnected continuously traveling web of said discrete articles and for transversely folding the severed articles about a predetermined point along their length, said method comprising the steps of successively:

a. grasping the leading portion of a first such article contained in said web at a first predetermined point along its length;

b. advancing said web a predetermined distance equivalent to the length of one of said articles while maintaining said web and the stretched elastic member secured thereto in tension sufficient to prevent puckering of said web;

c. grasping the trailing portion of said first article at a second predetermined point along its length prior to severance of said first article from said web;

d. transversely severing said first article from said web at a third predetermined point intermediate said first article and the adjacent article contained in said web while maintaining said first article, said web and the stretched elastic members secured to said article and said web in tension sufficient to prevent puckering of said article and said web; and

e. transversely folding said first article about a fourth predetermined point along its length by maintaining said article and the stretched elastic member secured thereto in tension sufficient to prevent puckering of said article until the transverse fold has been initiated.

4,022,457

SHEET FOLDING DEVICE

M. James Marin, South Norwalk, and Ferris Gene Keyt, Trumbull, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 9, 1975, Ser. No. 584,871
Int. Cl.² B65H *45/22*
U.S. Cl. 270—86 **5 Claims**

1. A method of folding successive sheets, comprising the steps of:

continuously feeding a sheet in a given direction along a predetermined linear path;

progressively scoring said sheet as the latter moves along said path; said scoring taking place to form two substantially parallel score lines that are substantially parallel to the direction of feed movement of said sheet along said linear path so as to thereby define two outermost sheet panels and a central panel;

laterally bending the two resultant outermost panels in opposite directions relative to the plane of the central panel through substantially 180 degree angles so as to thereby form a three-panel accordian folded sheet as said sheet continues to move along said linear path;

continuing feeding said sheet in said given direction along said predetermined path after said bending; and

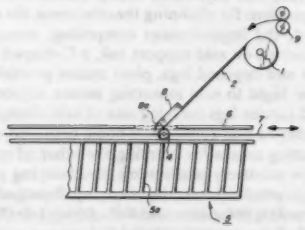
creasing the folded sheet in end-to-end progression along said score lines as said sheet moves along said continuous linear path.

4,022,458

SHEET DISTRIBUTION APPARATUS

Osamu Matsumoto, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed June 22, 1976, Ser. No. 698,653
Claims priority, application Japan, Sept. 22, 1975, 50-128936
Int. Cl.² B65H *39/10*
U.S. Cl. 271—173 **6 Claims**



1. In a sheet distribution apparatus for distributing sheets discharged from a reproducing machine, including: a sheet receiving body having a plurality of sheet receiving shelves which define a plurality of entrance openings and means for

sequentially distributing sheets into said shelves, the improvement wherein said distribution comprises:

a guide belt arranged between a position at which sheets are received for distribution and said sheet receiving body, said guide belt guiding said sheets into said sheet receiving shelves;

means for coiling up said guide belt, said coiling means comprising a take up roller arranged adjacent said position, one end of said guide belt being secured to said take-up roller; and

means for sequentially advancing the other end of said guide belt along said sheet receiving body adjacent said entrance openings to sequentially distribute said sheets into said shelves.

4,022,459

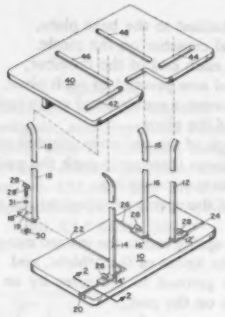
ENVELOPE STACKER

Richard A. Mather, 59 Strawhat Road, Apt. 1-A, Owings Mills, Md. 21117

Continuation of Ser. No. 491,312, July 24, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,590

Int. Cl.² B65H *31/20*

U.S. Cl. 271—223 **1 Claim**



1. An envelope stacking unit removably attachable with a printing press, said printing press including an elevator for receiving printed envelopes discharged therefrom, and a base for supporting said printing press, said envelope stacking means comprising:

a. an independent unit comprising a base member of substantially rectangular form adapted to be positioned below the said elevator and in substantially the same plane as the base of the printing press, at least one pair of slots of an inverted T-shape in cross-section extending laterally of said base and at least one pair of slots of an inverted T-shape in cross-section extending perpendicular to the first-mentioned slots in the said base;

b. a single upright standard extending upwardly from each of the said inverted T-shaped slots, means extending upwardly from the upper surface of the base and engaging said slots for fixing the position of each standard in adjustable position along the slots relative to the said base;

c. the length of the standards being substantially that of the operating distance of the elevator;

d. a table for receiving the said envelopes having the same number of elongated apertures as the number of slots in the base for receiving the said standards, the openings in the table being of such dimensions as to allow free passage of the standards within the opening of the table, the width of the table being such as to engage means carried by the elevator for raising and lowering said table relative to the base when the table of the said envelope stacking unit is in position to engage the said elevator engaging means;

e. each of said standards having an L-shaped foot integral therewith of greater width than said slots and having bores therethrough, said feet resting on the base above said upper portion of said slots, nuts larger than the slots slidably disposed in the lower portion of the slots aligned beneath the apertures in the L-shaped feet, and threaded thumbscrews passing through the apertures in the feet, the slots and the nuts to quickly and easily adjust the standards to a desired position.

4,022,460

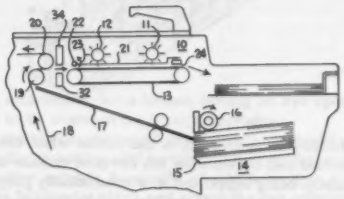
DOCUMENT JAM DETECTOR FOR COPIER

Wayne W. Pritchett, Fairfield, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Feb. 5, 1976, Ser. No. 655,414

Int. Cl.² B65H *7/14*

U.S. Cl. 271—258 **7 Claims**



1. In a document processing apparatus having a processing station and actuatable means for feeding documents to the station, a document jam detector comprising: a resettable timer having a timing cycle of predetermined duration and adapted to produce a jam-indicating signal at the end of said timing cycle, and timer control means for initiating the timing cycle of said resettable timer and resetting said resettable timer, said timer control means including:

a. a bistable latch having a plurality of inputs and a single output to said resettable timer;

b. means responsive to the actuation of said actuatable means for applying a signal to one of said plurality of inputs to set said latch into one of its bistable states; and

c. means responsive to the trailing edge of a document entering the processing station for applying a signal to another of said plurality of inputs to clear said latch to the other of its bistable states, wherein said trailing edge responsive means incudes:

i. a photoresponsive circuit at the entry to said processing station for producing a signal having one level while a document is present and another level while no document is present;

ii. a comparator amplifier connected to said photoresponsive circuit for comparing the output signal from said photoresponsive circuit against a reference signal to eliminate the effects of ambient light; and

iii. a pulse shaping circuit having an input from said comparator amplifier and an output to said bistable latch.

4,022,461

STAGE PROP

Steven Clay Harris, 3902 Nebraska Ave., Nashville, Tenn. 37209

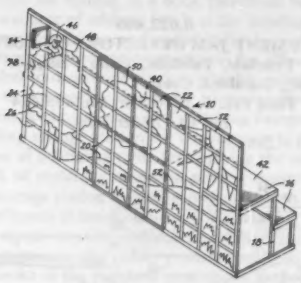
Filed Feb. 21, 1975, Ser. No. 551,779

Int. Cl.² A63J *1/02*

U.S. Cl. 272—22 **1 Claim**

1. Scenery for a stage production comprising a backdrop formed of a plurality of detachable sections of substantially equal size, each made up substantially completely of a plurality of substantially rectangular doors, each of said doors comprising a rectangular framework and being hinged on one side of said rectangular framework and having said framework covered on one face thereof except for a sufficient portion on each of the four sides of said rectangular framework to make

the checkerboard pattern on said sections and the overall checkerboard pattern of said backdrop visible from the covered side with a fibrous coating having a portion of a complete picture on each door thereon in the manner of a single piece of a multi-piece puzzle, at least one section having larger doors each made up of at least two of said rectangular doors with said larger doors hinged on opposite sides of a rectangle



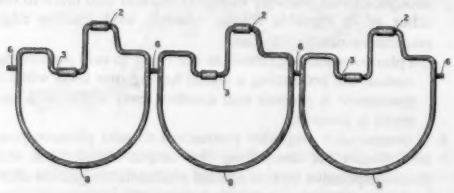
formed thereby so as to meet in the center when closed and open sideward and outward on the covered surface side, and said backdrop being supported in a substantially perpendicular position by a supported platform on the rear non-viewing side away from and out of sight of an audience, said platform comprising a plurality of detachable sections connected along vertical lines along which said detachable backdrop sections are joined.

4,022,462

APPARATUS FOR PERFORMING PHYSICAL EXERCISES

Enrique A. Peña-Kipper, Escobedo Sur 733-201, Monterrey, Mexico

Filed July 28, 1975, Ser. No. 599,882
Int. Cl.² A63B 5/22
U.S. Cl. 272—74 2 Claims



1. A rope jumping type device for performing physical exercises comprising in combination, a first jump rope device comprising a single piece carried by only the hands of the user with a hand held handle for rotating the apparatus having two offset grips joined by a central member and having laterally extending connection members to form a cross member horizontally positioned with the user, with a single curved framework part with arms extending from both connecting members in a single plane to produce a substantially U-shaped extension thereto with said offset grips disposed in upper and lower positions generally midway between the curved framework with the connecting members substantially normal to the two framework arms and having a male fitting extending from each of said connecting members a second jump rope device of substantially the same construction as said first device, except the fittings of said second jump rope device for female fittings, said fittings of said first and second jump rope devices being engageable to couple said first and second jump rope devices to permit two or more persons to jump side by side.

4,022,463

SPRING TYPE EXERCISING DEVICE

George T. Scott, Jr., Lubbock, Tex., assignor to Elmer's Weights, Inc., Lubbock, Tex.

Filed Nov. 14, 1975, Ser. No. 631,860
Int. Cl.² A63B 21/32
U.S. Cl. 272—136 4 Claims

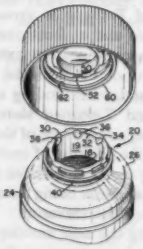
1. An exerciser comprising:
a. a base plate adapted for an athlete to place his feet thereon,
b. a pintle attached to the base plate,
c. a horizontal crossbar on the pintle,
d. a pivot on each end of the crossbar,
e. a horizontal arm pivoted to each pivot,
f. each arm having a padded end and a spring end on opposite sides of the pivot,
g. pads on each of the pad ends adapted to have the athlete place his knees thereon to push the pads together, and
h. at least one tension spring,
j. the ends of the spring attached to the spring end of the arms,
k. so that the spring resists the inward movement of the pads and thus the knees of the athlete, and
m. said pads pivoted to the arms by an upright pin in a bifurcation on the pad.

4,022,464

DISPENSING CONTAINER AND CLOSURE

Keith Parker, Warrington, England, assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Oct. 3, 1975, Ser. No. 619,272
Int. Cl.² B65D 33/36
U.S. Cl. 222—485 10 Claims



1. A dispensing package comprising a container having a round neck portion with an opening providing access to the container interior and a closure having a top wall overlying said neck opening;
said neck portion terminating in a flat top surface having inner and outer concentric edges with said inner edge including a plurality of indentations spaced apart about the circumference thereof;
said closure including a plurality of dispensing orifices ex-

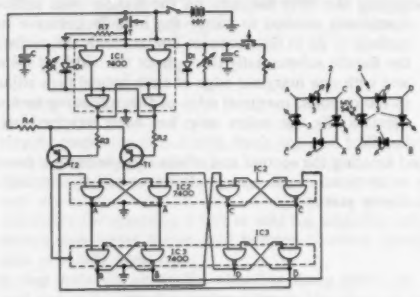
tending through said top wall and circumferentially spaced apart directly above said top surface a distance about equal to the distance between said indentations with an inner annular ring concentric with said dispensing orifices depending from said top wall radially inward from said dispensing orifices said ring presenting an imperforate continuous inner wall surface and an outer wall surface having a plurality of channels circumferentially spaced-apart a distance about equal to the distance between said orifices, said channel extending from a point proximate said top wall to the terminal end of said ring; said closure being rotatable to an open position about said neck portion to locate said orifices above said indentations and in communication with the container interior and to a closed position whereby said orifices overlie said top surface thereby preventing dispensation of materials from the container interior.

4,022,465

INDOOR BOARD GAMES

Brian Colling, Bathgate, and Raymond Duncan Fillingham, Milton of Campsie, both of Scotland, assignors to Dacoll Engineering Services Limited, Bathgate, Scotland

Division of Ser. No. 432,459, Jan. 11, 1974, Pat. No. 3,902,723. This application Feb. 27, 1975, Ser. No. 553,626
Int. Cl.² A63F *3/00*
U.S. Cl. 273—1 E **4 Claims**



1. Means for providing a test of skill for a player, said means including a device having cyclic triggering means, automatic switching means, logic gates of the automatic switching means, respective outputs of the logic gates, an array of light-emitting diodes and a stop-go switch connected to the cyclic triggering means which is, in turn, connected to the automatic switching means in which the logic gates are interconnected, the light-emitting diodes being connected between logic gate outputs of respective combinations of the logic gate outputs and the cyclic triggering means being arranged to trigger the automatic switching means so that said combinations of logic gate outputs provide signals lighting their respective light-emitting diodes one at a time in automatic succession, said stop-go switch being operable by the player to halt the triggering by the cyclic triggering means so that one only of the combinations of logic gate outputs remains in a state such as to light its associated light-emitting diode to provide a visual indication signal dependent on the player's skill in operating the stop-go switch.

4,022,466

HOCKEY HELMET ATTACHMENT

Thomas A. Kaiser, 19708 Avalon, St. Clair Shores, Mich. 48080

Filed June 11, 1976, Ser. No. 695,241
Int. Cl.² A63B *69/00, 71/10*
U.S. Cl. 273—1 B **8 Claims**

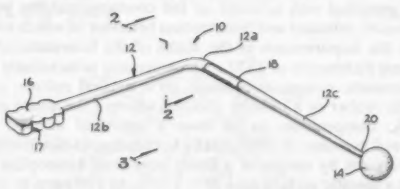
1. An attachment for a helmet having an eye opening and adapted to be worn on the head comprising:
a flat member constructed of an opaque material, and
means for mounting said member to said helmet so that said member extends forwardly of said helmet in a substantially horizontal plane and below the eye opening of said helmet to thereby obstruct the downwardly extending vision of a wearer of said helmet.

4,022,467

TENNIS PRACTICE DEVICE

Alfred P. Ruess, 1733 Ensley Ave., Los Angeles, Calif. 90024

Filed Sept. 13, 1974, Ser. No. 505,613
Int. Cl.² A63B *61/00*
U.S. Cl. 273—29 A **7 Claims**

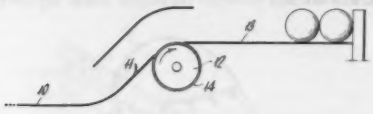


3. A device suitable for practicing racquet strokes comprised of:
a. a flexible member comprising first and second arms disposed at approximately right angles to each other and having a curved portion thereinbetween, said second arm having a knurled region at its end adjacent said curved portion, and said second arm being tapered from the vicinity of said knurled region down to its outer end;
b. a narrow, substantially rectangular handle disposed at the outer end of said first arm of said member, the plane of said handle being substantially coplanar with the plane of said first and second arms; and
c. a ball fixedly secured to said outer end of said second arm,
whereby, a user can practice backhand-related strokes by gripping said device by said handle in one hand and striking said ball with a racquet held in his other hand, and forehand-related, overhead and service strokes by gripping said device by said knurled region of said second arm in one hand and striking said ball with a racquet held in said other hand.

4,022,468
TIRE WHEEL FOR BOWLING BALL RETURN

Thomas M. Camilleri, 277 Avenue W, Brooklyn, N.Y. 11226

Filed Dec. 15, 1975, Ser. No. 640,430
Int. Cl.² A63D 5/02
U.S. Cl. 273—49 3 Claims

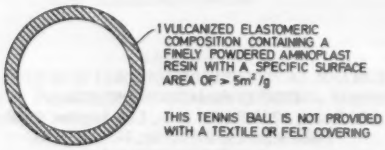


1. In a bowling ball return mechanism including a tire wheel in combination with a curved inclined conduit the improvement wherein the tire wheel has adhered to its ball-contacting surface a circumferential strip of a flexible elastomeric material having a high coefficient of friction, the ends of the strip being in abutting relationship, one end of the strip being provided with a bevel facing the direction of rotation.

4,022,469
TENNIS BALL

Francois René Lacoste, Neuilly, and Jean Marc Warnery, Boulogne, both of France, assignors to Patentex S.A., Fribourg and Ciba-Geigy AG, Basel, both of, Switzerland

Filed May 12, 1975, Ser. No. 576,937
Claims priority, application Switzerland, May 18, 1974, 6799/74
Int. Cl.² A63B 39/02
U.S. Cl. 273—61 C 21 Claims


1 VULCANIZED ELASTOMERIC COMPOSITION CONTAINING A FINELY POWDERED AMINOPLAST RESIN WITH A SPECIFIC SURFACE AREA OF > 5m² /g
THIS TENNIS BALL IS NOT PROVIDED WITH A TEXTILE OR FELT COVERING

1. A tennis ball comprising a hollow sphere, which is optionally provided with a textile or felt covering and the weight, diameter, rebound and deformation behavior of which comply with the requirements of the Rules of the International Law Tennis Federation of 1972 , which consists substantially of an elastomeric composition based on a natural rubber, a synthetic rubber or a mixture thereof, wherein the entire elastomeric composition, or at least a spherical annular layer thereof, contains in substantially homogeneous distribution 15 to 50 parts by weight of a finely powdered aminoplast resin with a specific surface area of > 5 m²/g, to 100 parts by weight of the respective rubber or rubber mixture.

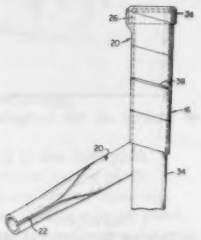
4,022,470
GRIP FOR IMPLEMENT HANDLE

Stephen Vidal, 6028 N. 23rd Ave., Phoenix, Ariz. 85015

Filed Oct. 8, 1975, Ser. No. 620,655
Int. Cl.² A63B 53/14
U.S. Cl. 273—81.5 22 Claims

1. A grip for use in combination with a rigid elongate implement handle comprising:
an elongate strip of elastomeric material of substantially greater length than width having a high degree of elasticity and of elastic memory;
the strip in unstressed condition extending longitudinally in a substantially straight line with the margins of the strip being parallel to each other and to the axis of the strip, and having a generally arcuate shape in cross section laterally of the axis of the strip throughout at least the major portion of its length;
the strip having a uniform thickness and being smooth on both faces and being formed of a material which has high friction characteristics;
the strip being adapted to be arranged on an elongate implement handle in helically wound form in substantial longitudinally stretched condition and with its initially concave inner surface in flat facewise contact with the surface of the handle substantially throughout the width of the strip, and with one marginal edge of each helical turn arranged adjacent to the opposed marginal edge of each preceding turn;
the elastic memory of the material being sufficient to cause the free marginal edges of the strip to press tightly against the surface of the handle.

19. A method of applying a grip to an implement handle having a free end comprising:
providing an elongate strip of elastomeric material having a high degree of elastic memory and having a generally



arcuate shape in cross section in unstressed condition throughout at least the major portion of its length;
applying a first end of the strip with its concave surface inward to the handle at its free end and wrapping the strip over its first end under tension to secure it in position by friction and elastic pressure;
wrapping the strip helically on the handle with sufficient continuing tension to cause the initially concave inner surface to lie in flat facewise contact with the surface of the handle substantially throughout the width of the strip and with one marginal edge of each helical turn adjacent to the opposed marginal edge of the preceding turn until substantially the entire strip has been wrapped on the handle;
and locating the second end of the strip under the previous wrap to secure it against displacement by friction and elastic pressure.

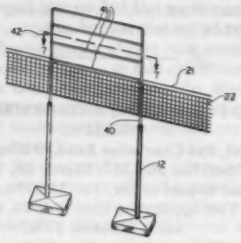
4,022,471
VOLLEYBALL TRAINING AND BLOCKING DEVICE

Dennis Herbert Keller, 3475 Witt Road, Auburn, Calif. 95603

Continuation-in-part of Ser. No. 501,969, Aug. 30, 1974, Pat. No. 3,897,950. This application July 28, 1975, Ser. No. 599,651
Int. Cl.² A63B 71/02
U.S. Cl. 273—102.4 10 Claims

1. A volleyball training device for use with a regulation volleyball having a prescribed diameter D comprising a standard to be positioned adjacent to a volleyball net;
an operating head engaging such standard and including a plurality of arm members extending from said standard and defining a substantially open region to view therethrough yet a barrier to prevent the passage of volleyballs of diameter D therethrough;

said arm members spaced less than a volleyball diameter D



apart but at such distance that a volleyball may simultaneously stroke either one or two of said arm members.

4,022,472

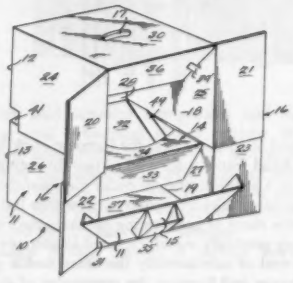
TARGET GAME

Calvin L. Seals, P.O. Box 424, Daphne, Ala. 36526

Filed Nov. 24, 1975, Ser. No. 634,745

Int. Cl.² A63B *63/00*

U.S. Cl. 273—105 R **10 Claims**



1. A game comprising

a ball,

a target comprising closed side, back, top and bottom walls and a generally open front,

a divider in said target dividing said target into bottom and top chambers, said divider having means associated therewith for retaining a ball in said top chamber which enters said target above said bottom chamber through said generally open front,

side flap members vertically extending along either side of said generally open front of said target, the plane of each flap member making an angle of greater than 90° with respect to the plane of the generally open front of said target, and means for retaining a ball in said bottom chamber that enters said bottom chamber of said target below said top chamber through said generally open front.

4,022,473

APPARATUS FOR PLAYING MATCHING GAME

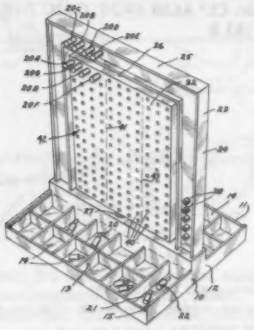
Charles F. Foley, 3908 Merriam Road, Minnetonka, Minn. 55343

Continuation-in-part of Ser. No. 395,392, Sept. 10, 1973, abandoned. This application June 10, 1975, Ser. No. 585,764

Int. Cl.² A63F *3/00*

U.S. Cl. 273—130 R **26 Claims**

9. An apparatus for playing and scoring matching games using different indicia members comprising a frame, a plurality of indicia members of each of a plurality of different indicia for each player, a game board having spaced oppositely facing co-extensive surfaces and being mounted to said frame for rotation about an axis, said board being rotatable about said axis from a first position substantially 180° to a second position whereby the surfaces face in opposite directions in the respective two positions, a plurality of separate means on opposite sides of said frame, each of said separate means being adapted to retain an indicia member in alignment with portions of said game board, first means for retaining indicia



members on each of said surfaces arranged in first rows, each first row including a plurality of said first means, each first row being in alignment with one of said separate means with said game board in either of said first or second positions, and parallel second rows of indicia member retaining means on each board surface adjacent to and aligned with the first means forming the first rows and separated therefrom to provide means for scoring said matching games.

4,022,474

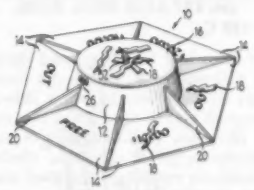
GAME APPARATUS

Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed June 30, 1975, Ser. No. 591,393

Int. Cl.² A63H *33/26;* **A63F** *9/00*

U.S. Cl. 273—138 A **6 Claims**



1. A game apparatus, comprising: a game board having a generally centrally disposed housing thereon defining a generally flat elevated playing surface horizontally on top of the housing, with the game board surrounding and protruding radially outwardly of the housing below the elevated playing surface;

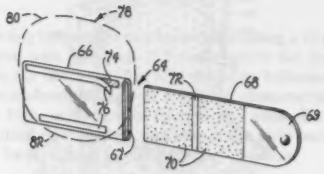
drive means mounted within the housing and having a rotatable magnetic spindle extending vertically upwardly through the playing surface;

means to selectively energize said drive means; and

a plurality of generally flat irregularly shaped metallic playing pieces, at least one for each player of the game, positionable on the elevated playing surface about the rotatable spindle whereby the playing pieces are magnetically attracted to the spindle so that when rotated by said drive means at least some of the playing pieces are moved by the spindle over the playing surface into engagement with

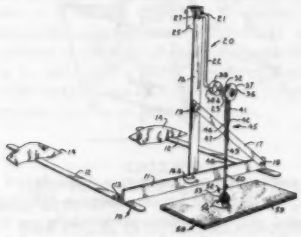
at least some of the other playing pieces to propel at least some of the playing pieces off of the playing surface onto the game board.

4,022,475
GOLF TRAINING AID
Irma L. Todd, 395 N. Frankwood Ave., Sanger, Calif. 93657
Filed Dec. 12, 1974, Ser. No. 532,040
Int. Cl.² A63B *69/36*; **G02C** *7/16*
U.S. Cl. 273—183 B **2 Claims**



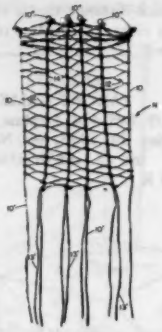
1. A golf training aid comprising:
vision screening means having an opaque portion and a transparent portion;
frame means disposed to movably mount said vision screening means with respect to said frame means, said frame means includes a transparent envelope with a slot shaped bore disposed to receive said vision screening means for reciprocal movement therein; and
frame mounting means interconnected with said frame means and disposed to mount said frame means in a user's line of sight with a golf ball, when said user is in striking position with respect to said golf ball, said frame mounting means includes an adhesive area on said frame means disposed for attachment to the glass of a pair of eye glasses.

4,022,476
GOLF PRACTICE DEVICE
C. Dickinson Barton, c/o Barton Industries, 236 W. 54th St., Kansas City, Mo. 64112
Continuation-in-part of Ser. No. 626,848, Oct. 29, 1975, abandoned. This application June 14, 1976, Ser. No. 695,830
Int. Cl.² A63B *69/36*, *43/00*
U.S. Cl. 273—185 C **11 Claims**



1. Apparatus for use to practice striking a ball, said apparatus comprising:
support means for supporting the apparatus on a surface;
a frame member on said support means extending above the surface;
an arm member bent in a manner to provide upper and lower end portions that are vertically and horizontally offset from one another, said upper end portion being supported on said frame member to pivot about a first substantially horizontal axis;
a vertically oriented suspension member supported on the lower end portion of said arm member to swing about a second substantially horizontal axis offset from and parallel to said first axis;
a ball; and
means for mounting said ball on said suspension member at a location below said second axis.

4,022,477
METHOD FOR MAKING PREFORMED LACROSSE NETTING
Robert B. Pool, 564 Charleston Road, Willingboro, N.J. 08046
Division of Ser. No. 562,217, March 26, 1975, which is a continuation-in-part of Ser. No. 347,709, April 4, 1973, abandoned. This application Oct. 6, 1976, Ser. No. 730,078
Int. Cl.² A63B *59/02*
U.S. Cl. 273—96 D **4 Claims**



1. A method of forming nets for lacrosse stick head frames wherein the head frame is formed of two diverging side members joined at a jointure and an outer end member to form a net area of substantially triangular form within the said frame, comprising the steps of preforming an elongated netting, said netting having generally equally spaced interstices and having at least one end of substantially the same width as the outer end of the frame and forming the remainder of the net wider than the area lying between the diverging side members, said netting being of substantially rectangular shape and formed from interlooping longitudinal cords with cross cords and a lapping cover cord about the looped area of cross cords and extending over the loops for protection of loops from wear by a playing ball, tightly lacing the edge of the above-mentioned end of the preformed net to the outer end member and side members adjacent their outer ends and attaching the remaining side edges of the net to the remaining portion of the respective side wall members throughout their length, thereby forming a sloping pocket in the net extending inwardly and downwardly from the outer end member to the opposite end of the net area.

4,022,478
PUSH-BUTTON VIDEO DISC HUB
David S. Stewart, Palatine, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.
Filed July 3, 1975, Ser. No. 592,975
Int. Cl.² G11B *5/82*, *17/00*
U.S. Cl. 274—10 S **2 Claims**

1. A hub assembly for releasably securing a centrally apertured record disc for rotation in a disc player, said apparatus comprising:
a disc supporting base member havng an aperture and further having means comprising an upstanding rim surrounding said base member aperture adapted to index a record disc;
a hollow sleeve formed of elastic material and deformable from a quiescent upright position for admitting a record

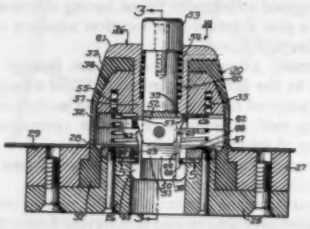
disc to said base member to a compressed operative position for securing such a disc;

said sleeve having a footing received within said aperture and coupled to said base member, a substantially cylindrical portion contiguous to said footing and disposed adjacent said indexing means of said base member,

a conical portion contiguous to said cylindrical portion and tapered to a dimension less than the diameter of said cylindrical porton, said cylindrical portion of said sleeve having a wall thickness significantly thinner than the wall of said conical portion;

a core member disposed within said tapered sleeve portion for preserving the contour of said tapered portion when said sleeve is compressed to its operative position;

an actuator, extending through said sleeve and said core member, engageable with said tapered sleeve portion and displaceable with said sleeve along the central axis of said sleeve from a quiescent position in which said sleeve is maintained in an upright position to an operating position



in which said actuator compresses said sleeve to first collapse said cylindrical sleeve portion in a direction normal to said central axis and over said indexing rim and then drive said collapsed portion against the upper inner peripheral surface of an indexed record disc positioned upon said base member to effect a uniform clamping of the record against said base member,

said actuator further having a section having a detent groove;

a latch spring embracing said actuator section and engageable with said actuator detent groove, when said actuator is displaced to said operating position, for retaining said actuator in its operative position; means in said base member for retaining said latch spring; and

axially displaceable release means centrally disposed within said actuator and comprising a tapered trip member for disengaging said latch spring from said actuator detent groove to permit said compressed sleeve and said actuator to return to their quiescent positions thereby freeing said record disc.

4,022,479

SEALING RINGS

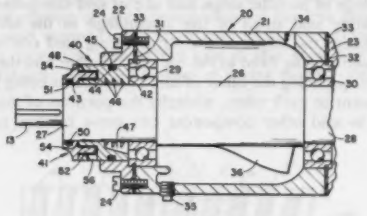
David C. Orlowski, 10915 73rd Ave., Rock Island, Ill. 61201

Filed Jan. 2, 1976, Ser. No. 645,990

Int. Cl.² F16J *15/44*

U.S. Cl. 277—53 **10 Claims**

1. A ring seal between a fixed housing and a rotating shaft comprising: a first ring member having one end facing internally of the housing and a second end facing externally of the housing and being fixed and sealed to the housing and having a series of internal labyrinth annular grooves disposed adacent the shaft and an axially extending groove joining the annular grooves and opening to said first end and in communication with the housing, said first ring member further having an annular recess extending axially from and opening to said second end; and a second ring fixed to rotate with the shaft and having an annular flange extending axially from inner and outer radial surfaces and adapted for insertion in the annular



recess with said radial surfaces bearing against the second end of the first ring member.

4,022,480

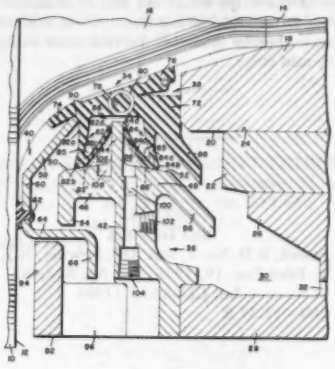
NECK SEAL

Lowell S. Salter, Jr., Shrewsbury, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed Oct. 7, 1975, Ser. No. 620,492

Int. Cl.² F16J *15/34*

U.S. Cl. 277—95 **6 Claims**



1. An integrally fabricated neck seal comprising: a circular flexible seal body adapted to be mounted on a roll neck for rotation therewith; a pair of axially spaced resilient external flanges on said seal body, each of said flanges having a first annular section extending radially outwardly from said seal body to a radially outwardly facing peripheral shoulder, at least one of said flanges being further provided with a second annular section extending inwardly from its peripheral shoulder towards said seal body, the first and second annular sections of the said one flange being arranged in a non-parallel relationship to define a groove therebetween.

4,022,481

COMPLIANT STRUCTURAL MEMBERS

John V. Long, El Cajon, and George D. Cremer, Lemon Grove, both of Calif., assignors to International Harvester Company, San Diego, Calif.

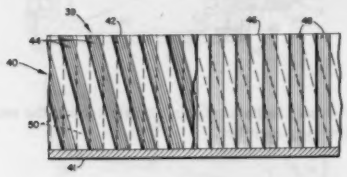
Division of Ser. No. 335,320, Feb. 23, 1973, Pat. No. 3,916,054. This application Mar. 21, 1975, Ser. No. 560,607

Int. Cl.² B32B *3/12;* **F16J** *15/34*

U.S. Cl. 277—96.1 **16 Claims**

1. In a machine having two, juxtaposed, relatively movable components, means providing a seal between said components comprising an assemblage of deformable metallic strips disposed in side-by-side relationship with the opposite edges of

the strips respectively facing one and the other of said components; means spacing said strips apart to provide interstices therebetween; and a backing member disposed between said assemblage of metallic strips and one of said components for maintaining said strips of the assemblage in the aforesaid relationship; the edges of the strips facing said one of said components being fixed to the backing member and the edges of the strips facing the other of said components being free of attachment to each other, whereby the portions of the strips nearer to said other component can move relative to each



other and to said other component to provide a compliant seal between said assemblage of metallic strips and said other component; the means spacing said strips apart comprising corrugations formed in at least part of said strips; and said strips being oriented to extend in the direction of relative movement between said components with the corrugations at the edges of the strips which are free of attachment to each other being at an angle of less than 90° to said direction of movement to thereby minimize the resistance to deformation offered by said strips.

4,022,482

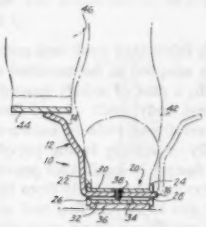
SKI DEVICE

William Powell, R.D. No. 1, Box 857, Newton, N.J. 07860

Filed Dec. 19, 1975, Ser. No. 642,462

Int. Cl.² A63C *11/00*

U.S. Cl. 280—11.37 E **8 Claims**



1. An accessory for use with ski apparatus, or the like, comprising, in combination: a generally L-shaped bracket member having a first portion that is capable of supporting one foot of a skier at a position that is above and out of contact with a skiing surface, and attachment means for attaching a lower second portion of said bracket member to ski apparatus carried by the opposite foot of the skier, said attachment means comprising a pair of laterally spaced apart side surfaces each having a slot formed therein whereby said second portion of said bracket member may be inserted into either one of said slots, said attachment means further including a transverse wall connecting said side surfaces, said attachment means further including a fastener passing through said transverse wall and interconnecting said second portion of said bracket member and said attachment means.

4,022,483

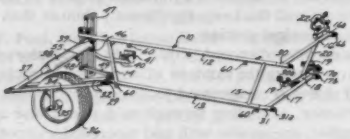
SIDE CAR ATTACHMENT FOR MOTORCYCLES

Clarence H. Wallick, 6141 Orange Ave., Cypress, Calif. 90630, and Ghraydon Lynn Wallick, 1926 Placentia No. 9, Costa Mesa, Calif. 92627

Filed Oct. 14, 1975, Ser. No. 622,145

Int. Cl.² B62K *27/02*

U.S. Cl. 280—203 **4 Claims**



1. A side car attachment for a motorcycle, said attachment comprising:

an elongated attachment frame having a forward extremity and a rear extremity for location adjacent one side of a motorcycle frame;

transversely extending parallelogram linkage means coupled to the forward extremity of said attachment frame and adapted to be coupled to said motorcycle frame for tilting said attachment frame in correspondence with tilting of said motorcycle frame;

wheel means carried by said attachment frame for supporting said attachment frame; and

connecting means for coupling the rear extremity of said attachment frame to said motorcycle frame, said connecting means including track means defining a track which is generally vertically oriented in the upright positions of said attachment frame and said motorcycle frame; and follower means comprising a follower rotatable within said track to permit tilting of said attachment frame relative to said motorcycle frame, said follower further being movable along said track, one of said track means and said follower means being coupled to said attachment frame, and the other of said track means and said follower means being adapted for coupling to said motorcycle frame.

4,022,484

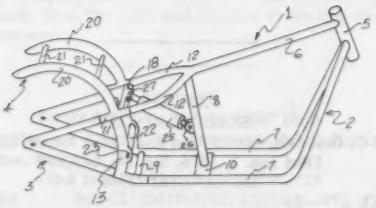
MOTORCYCLE FRAME AND SUSPENSION AND METHODS OF MAKING AND USING THE SAME

William F. Davis, 6234 Langdon Court, Berkeley, Mo. 63134

Filed Mar. 15, 1976, Ser. No. 666,669

Int. Cl.² B62K *25/10*

U.S. Cl. 280—284 **1 Claim**



1. A motorcycle frame comprising,

a main frame, comprising a first vertical member, a plurality of longitudinal members attached to and extending rearwardly from said first vertical member, a second vertical member operably coupling said longitudinal members and a plurality of contoured rear vertical members disposed between said longitudinal members,

a rear frame, comprising a plurality of longitudinal members coupled at one end thereof and a plurality of contoured

vertical members disposed between said longitudinal members, said rear frame pivotally mounted to said main frame, and

transitional structure means operably mounted on said main frame, and

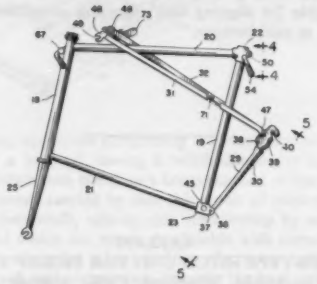
damping means operably connecting said main frame to said rear frame.

4,022,485

COLLAPSIBLE BICYCLE

Elward LeRoy Cox, 2737 Grosse Point Road, Evanston, Ill. 60201

Filed Apr. 5, 1976, Ser. No. 673,702
Int. Cl.² B62K *15/00*
U.S. Cl. 280—287 **6 Claims**



1. A collapsible bicycle frame comprising a front frame and a collapsible rear frame movable between riding and storage positions, the front frame including a plurality of elongated frame members interconnected to form a polygonal main frame having a front and a rear, a wheel fork rotatably mounted at the front of the main frame in one of the frame members and adapted to be connected to the axle of a bicycle wheel, the collapsible rear frame including a first pair of rear wheel support struts pivotally connected to the main frame at the rear thereof and extending rearwardly thereof, a second pair of rear wheel support struts connected to the first pair of struts and extending upwardly and forwardly therefrom, axle-connecting means on one of the pairs of struts for connecting the struts to the axle of a bicycle wheel when the rear frame is in the riding position, first connector means on the rear of the main frame for releasably connecting the upper ends of the second pair of struts to the main frame at the rear thereof whereby the first and second pairs of struts are maintained in a riding position and can rigidly support a wheel connected to the struts, and second connecting means at the front of the frame for releasably connecting the upper ends of the second pair of struts to the main frame at the front thereof when the first pair of struts is pivoted about is pivotal connection to the main frame whereby the rear frame is maintained in a storage position.

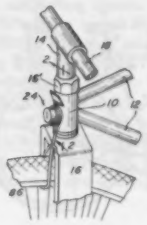
4,022,486

LOCK

Charles E. Plaiss, 6834 W. Devon Ave., Chicago, Ill. 60631

Continuation-in-part of Ser. No. 504,537, Sept. 16, 1974, abandoned. This application May 27, 1975, Ser. No. 580,938
Int. Cl.² B62H *5/06, 5/16;* **E05B** *71/00*
U.S. Cl. 280—289 L **4 Claims**

1. A bicycle or the like having a hollow head, a tubular stem anchored to the upper end of the front wheel fork and handlebars secured to the other end of said stem, means to secure said stem to said head, and a common bore extending horizontally in said stem and head which extends interiorly into the stem, in combination with a lock to prevent rotation of said stem, said lock comprising a removable housing having a stepped portion, said stepped portion being insertable in and through the common bore and partially extending into the interior of said stem, a rotary shaft in said housing having a stepped portion, a set of tumblers operatively secured to one end of said shaft and positioned interiorly of said housing, means to actuate the same, said stepped portion of said shaft being of a diameter less than the inside diameter of the stepped portion of said housing adjacent the free end of said shaft, said stepped portion of said shaft having four slots therein extending toward the axis of said shaft and spaced equi-distantly apart, a plurality of spring means, one end of



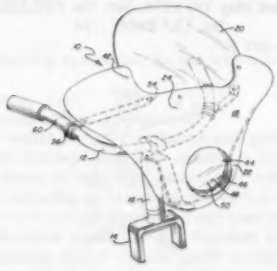
each of said spring means anchored in one of the slots and the remainder of said spring means wound partially around said stepped end of said shaft, a pair of slots in the stepped portion of said housing in cooperative relation and registry with the free ends of said spring means whereby, when the stepped portion of said lock housing is inserted in said bores and upon rotation of said shaft, the spring means will extend through and outwardly of said housing stepped portion and said springs will bear against the inner wall of said stem.

4,022,487

BICYCLE FAIRING AND BRACKET THEREFOR

William F. Leahy, 624 Edwards, West Dundee, Ill. 60118

Filed Apr. 26, 1976, Ser. No. 679,989
Int. Cl.² B62J *17/04*
U.S. Cl. 280—289 S **5 Claims**



1. A bicycle fairing for a bicycle having a frame, handlebar, fork holder and releasable coupling securing the handlebar to the fork holder, the fairing comprising a unitary body of dish-shaped configuration including a nose, a floor extending rearwardly from the nose, a curved top extending rearwardly but upwardly from the nose and a pair of curved wings, side portions joining said floor and wings, each side portion including an area having a 90° inward curvature, a transparent shield secured to said body between the wings, brace means secured to said wings and extending rearwardly thereof on opposite sides of said shield, clamp means carried by said brace means for coupling same to the handlebar and a bracket capable of securing the fairing to the fork holder, said bracket being rotable 180° about its axis whereby to enable assembly of said fairing to one or the other of the conventional and hi-rise bicycles.

4,022,488
GUARD FRAME FOR BICYCLE TANDEM CHILD SEAT

Richard J. Likas, 825 High Ave., Sheboygan, Wis. 53081

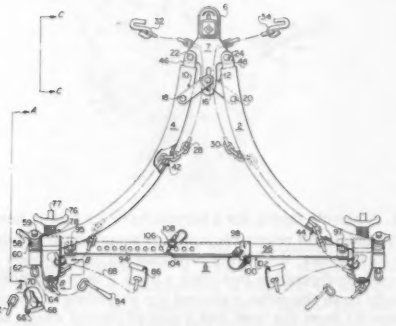
Filed Mar. 15, 1976, Ser. No. 667,019
Int. Cl.² B62J 27/00
U.S. Cl. 280—289 A 8 Claims

1. In combination with a bicycle frame of the type including an upper rear portion for the support of a seat therefrom and a pair of opposite side rearwardly projecting portions for journaling a rear wheel therebetween, a protective guard structure for protecting a child's seat supported from said frame rearward of said upper rear portion, said guard structure comprising an upright protective frame including opposite side upstanding portions interconnected at their upper ends by means of a connecting portion extending and connected therebetween, means anchoring the lower end portions of said upstanding portions to corresponding opposite side rearwardly projecting portions of said bicycle frame, and means extending between and interconnecting vertical midportions of said upstanding portions and said upper rear portion of said bicycle frame, said protective frame being spaced behind said upper rear portion of said bicycle frame.

4,022,489
UNIVERSAL CURVED TOWBAR

Henry S. Shattles, and John C. Abromavage, both of Tempe, Ariz., assignors to Amerco, Inc., Phoenix, Ariz.

Filed May 14, 1976, Ser. No. 686,335
Int. Cl.² B60D 1/14
U.S. Cl. 280—491 E 13 Claims



1. A universal curved towbar assembly, operable for engaging the bumper of a vehicle to be towed, comprising, in combination:

A. a coupling means, of the ball socket type; and

B. a pair of curved arm assemblies each including a convex side and diverging, in a lateral plane, from said coupling means, wherein the respective convex sides of said curved arm assemblies are in a facing relationship, each of said curved arm assemblies having a proximate end pivotably secured to said coupling means and a distal end including a bumper mounting assembly; wherein

C. said each bumper mounting assembly further comprises a bumper mounting pad surface, and,

i. a first engagement means, operable for releasably tensioning said mounting pad against a bumper, and

ii. a second engagement means, operable for releasably and adjustably tensioning, in opposition to said first engagement means, said mounting pad against said bumper; and

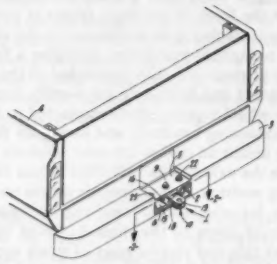
iii. a third engagement means, operable for releasably and adjustably tensioning redundantly with said second engagement means, said mounting pad against said bumper; and

D. spreader bar means, extending laterally between the respective distal ends of said curved arm assemblies, operable for aligning said mounting assemblies with respect to said bumper.

4,022,490
TURRET-TYPE HITCH UNIT FOR PICKUP TRUCKS

Alvin N. Rocksvold, Woodland, Calif., assignor to Marvin Landplane, Woodland, Calif.

Filed Feb. 17, 1976, Ser. No. 658,625
Int. Cl.² B60R 21/00
U.S. Cl. 280—500 3 Claims



1. A hitch unit comprising, in combination with a vehicle bumper having a horizontally outwardly opening pocket therein intermediate its ends, a rotary structure pivoted in the pocket for vertical axis rotation, a rigid hitch, a ball hitch, and a swinging hitch included with the rotary structure in circumferentially spaced relation about said axis and radially outwardly thereof, each hitch in a corresponding predetermined rotative position of said rotary structure being out of the pocket and exposed rearwardly of the bumper for use, and means to releasably lock the rotary structure in said predetermined positions, selectively; the rotary structure including a bar having opposite end portions projecting beyond said axis, one projecting end portion of the bar comprising the rigid hitch in part, the ball hitch being mounted on the other projecting end portion of such bar, the swinging hitch projecting laterally from the bar substantially centrally of its ends, and means mounting the swinging hitch in connection with the bar vertical swinging motion when disposed out of the pocket for use; the rotary structure additionally including another bar above said first-named bar, and said other bar having an end portion which projects in spaced, overhanging relation to said one projecting end portion of such first-named bar, such end portions of the bars forming, of clevis type, said rigid hitch.

4,022,491

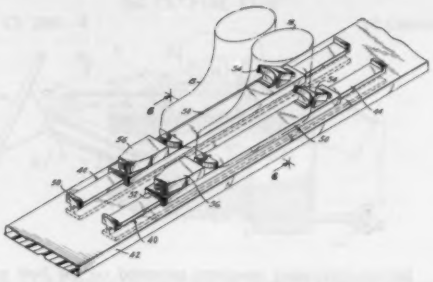
SKI APPARATUS

William Powell, R.D. 1, Box 857, Newton, N.J. 07860

Filed Dec. 22, 1975, Ser. No. 643,505

Int. Cl.² A63C 9/00

U.S. Cl. 280—618 7 Claims



1. Skiing apparatus comprising: an elongated ski assembly including a base ski, having a width dimension sufficient to accommodate both the skier's boots thereon at the same time; support means carried by said ski; a pair of plate means carried in substantially side-by-side relationship by said support means and which are relatively slidable with respect thereto; means for mounting a heel and toe clamp assembly for a ski boot on each said plate means whereby the heel and toe clamp assemblies are independently and selectively movable longitudinally relative to the length dimension of said ski together with said associated plate means and the ski boots clamped by said assemblies; and guide means for retaining said plate means during the movement thereof, said guide means comprising a groove formed in the surface of each said plate means that is in confronting opposition to upper surfaces of said ski assembly, and said support means comprising a pair of longitudinally extending, elongated side-by-side members having upper and lower ends and a connecting web, said upper ends of said members being received in said slots in said plate means, said lower ends of said side-by-side members being carried by the ski.

4,022,492

RELEASE-SKI BINDING

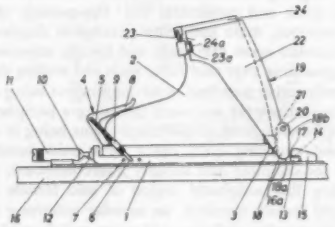
Ulrich Gertsch, Matten, Switzerland, assignor to Gertsch AG, Zug, Switzerland

Filed Dec. 3, 1975, Ser. No. 637,304

Claims priority, application Switzerland, Dec. 31, 1974, 17408/74

Int. Cl.² A63C 9/086

U.S. Cl. 280—618 10 Claims



1. A release - ski binding for use with a ski having an upper surface and a ski boot, comprising

a release plate releasably connected with a ski boot and a ski, respectively, said release plate including a rear end,

a rear holding member means for releasably anchoring said release plate at said rear end on said ski, and cooperatively permitting release of said release plate by relative longitudinal movement of said rear holding member means and said release plate, said rear holding member means having a front facing side,

spring means for providing a longitudinal force component for operatively holding said rear end of said release plate in engagement with said rear holding member means,

lever means for operatively acting on said release plate and for operatively coupling with a leg of a skier above an ankle of the leg, said lever means for being in operative connection with said spring means,

said lever means includes a lower arm having a rear side operatively abuttingly engaging said front facing side of said rear holding member means for longitudinally displacing said release plate relative to said rear holding member means against the action of said spring means when said lever means is moved by a bending of the leg so as to release the holding engagement of said rear holding member means from said release plate, and said lower arm having a lowermost end spaced from the upper surface of said ski.

4,022,493

ADJUSTING MECHANISM FOR SKI BINDINGS

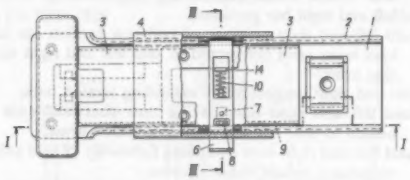
Erwin Weigl, Brunn am Gebirge, and Josef Svoboda, Schwechat, both of Austria, assignors to Gertsch AG, Zug, Switzerland

Filed Aug. 15, 1975, Ser. No. 604,913

Claims priority, application Austria, Sept. 13, 1974, 7442/74

Int. Cl.² A63C 9/22

U.S. Cl. 280—633 5 Claims



1. An adjusting mechanism for use with a ski binding, comprising:

base means;

guide means on said base means;

carriage means movably guided on said guide means;

releasable locking means for releasably locking said carriage means to said base means, said releasable locking means including an elongated row of first teeth means on one of said carriage means and said base means extending in a direction parallel to the direction of movement of said carriage means on said guide means and a locking slide member on the other of said carriage means and said base means and having second teeth means thereon engageable with said first teeth means;

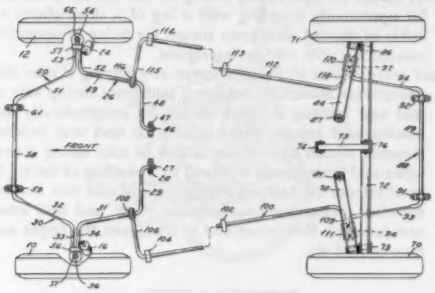
resilient means for resiliently urging said second teeth means into engagement and vertical alignment with said first teeth means; and

support means for supporting said locking slide member for reciprocal movement in a direction transverse of said direction of movement of said carriage means to effect a movement of said second teeth means into and out of engagement and vertical alignment with said first teeth means, said support means including stop means directly engaging said locking slide member for limiting the movement of said locking slide member under the urging of said resilient means to effect a meshing, vertical alignment with said first and second teeth means while said locking slide member is engaging said stop means.

4,022,494
MOTOR VEHICLE REAR SUSPENSION SYSTEM

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,804
Int. Cl.² B60G 11/20
U.S. Cl. 280—723 4 Claims



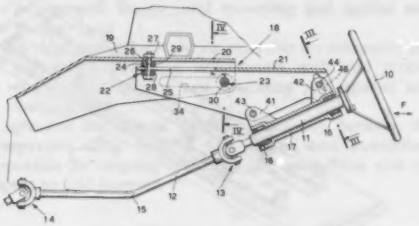
1. A motor vehicle suspension system having a vehicle frame;
left and right wheels rotatably supported by an axle;
axle positioning means interconnecting said axle and said frame;
said axle positioning means including left and right laterally extending suspension arms pivotally connected to said axle;
left and right compression links connecting the inner ends of said left and right suspension arms, respectively, to said vehicle frame;
a rear torsion bar having a transverse portion supported on said vehicle frame and having longitudinally extending left and right bar portions;
said left and right portions of said rear torsion bar having load lever arms connected to said left and right suspension arms;
left and right longitudinally extending torsion bars;
said left and right bars having their rearward ends connected to said left and right suspension arms;
said left and right bars extending forwardly of said axle and connected to said vehicle frame;
a longitudinally extending suspension arm pivotally connected to said frame and said axle.

4,022,495
SAFETY DEVICE FOR A MOTOR VEHICLE STEERING SYSTEM

Guido Pizzocri, Gerenzano (Varese), Italy, assignor to Industria Napoletana Costruzione Autoveicoli Alfa Romeo ALFASUD S.p.A., Italy

Filed Aug. 27, 1975, Ser. No. 608,288
Claims priority, application Italy, Sept. 11, 1974, 27183/74
Int. Cl.² B62D 1/18
U.S. Cl. 280—750 2 Claims

1. A safety device for a steering column of a vehicle, comprising:
a vehicle body;
a steering column inclined downwardly relative to a horizontal plane on said vehicle body, said steering column comprising at least an upper and lower elongated part terminally connected by universal joints, a lower portion of the lower elongated part having an intermediate deformation-inducing portion for absorbing impact when subject to impact of a driver striking the steering column at a predetermined force;
a sleeve rotatably-supporting the upper steering column part;
a first bracket fixed to said vehicle body;
a second bracket disposed within said first bracket, said brackets including horizontally disposed slot portions, bolt assemblies extending from the brackets through said slot portion whereby the brackets have relative horizontal movement and are restrained to such relative movement, said sleeve rotatably-supporting the upper steering column part depending from said second bracket; and

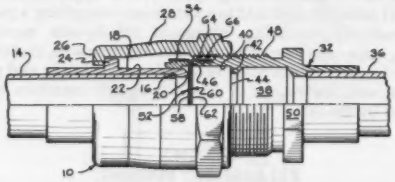


friction-increasing members mounted on the bolt assemblies on brackets and between adjacent surfaces of the brackets whereby the relative horizontal movement between the brackets is resisted.

4,022,496
FRANGIBLE DIAPHRAGM REFRIGERATION COUPLING

Charles F. Crissy, and Christopher L. T. Corbin, both of Jackson, Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Mar. 31, 1975, Ser. No. 563,714
Int. Cl.² F16L 35/00
U.S. Cl. 285—3 7 Claims



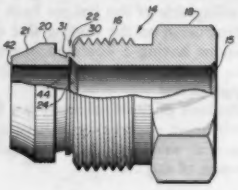
1. A coupling for a closed fluid system characterized by an uninterrupted flow path upon the coupling members being fully coupled, comprising, in combination, male and female coupling members each having a passage defined therein, interconnectible threaded nut union means defined on said members for moving said members toward each other in passage aligning relation, each of said members including an annular outer end concentric with the passage of the associated member, male and female frangible diaphragms sealingly mounted upon said male and female members, respectively, extending over said outer ends and sealing the passages of said respective members, said diaphragms being of substantially equal diameter and each including a peripheral region, the peripheral regions of said diaphragms being in axial alignment and engaging each other upon said members being aligned for coupling and initially interconnected, means axially fixing the peripheral region of said female diaphragm upon said female member, an annular extension defined on said male member defining said outer end thereof, and annular periphery means axially slidably mounting said male diaphragm peripheral region on said extension, said diaphragm peripheral regions sealingly engaging during coupling of said members as said extension is axially displaced through said annular peripheral means and the outer end of said extension ruptures said diaphragms and fold the ruptured diaphragms upon said extension.

4,022,497

ONE-PIECE NUT AND SLEEVE FOR IMPROVED TUBE FITTING

Mike D. Kotsakis, Mount Prospect, Ill., assignor to Imperial-Eastman Corporation, Chicago, Ill.

Filed Jan. 9, 1976, Ser. No. 647,704
Int. Cl.² F16L *35/00*
U.S. Cl. 285—4 10 Claims



1. In a tube fitting having a female coupling element with an internally threaded passageway and a one-piece male coupling element, said male coupling element having a body member, a passageway through such body member, an exterior threaded portion at one end, a shearable sleeve at the opposite end, and an intermediate frangible connecting portion in the passageway space between the female coupling element and an inserted tube, said frangible connecting portion being substantially lowered relative to said shearable sleeve and said female coupling element, the improvement to said frangible connecting portion, comprising

a continuous outer exterior shear groove,

a continuous inner exterior shear groove spaced axially relative to said outer exterior shear groove,

a continuous interior shear groove placed between said exterior shear grooves,

a inner break point web between the continuous inner exterior and continuous interior shear grooves, and

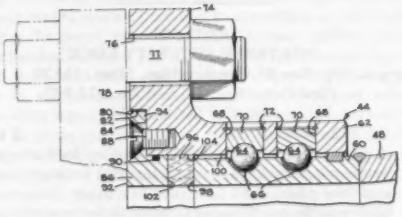
an outer break point web between the continuous outer exterior and continuous interior shear grooves, at least one of said break points being sufficiently thin to obtain shearing of the sleeve upon making up the fitting by connecting the male and female coupling element.

4,022,498

FLUID LOADING ARM SWIVEL JOINT

Neal E. Jameson, Orange, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Feb. 24, 1975, Ser. No. 552,092
Int. Cl.² F16L *55/00*
U.S. Cl. 285—16 7 Claims



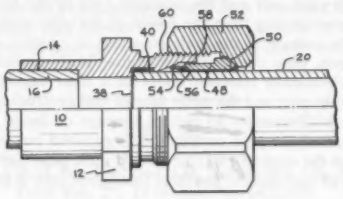
1. In a fluid loading arm for transferring fluid between a reservoir facility and a fluid transport vessel, said arm comprising a fluid conducting arm section pivotally connected to a support, and a coupling assembly for connecting the arm section to the transport vessel, said coupling assembly including a pipe section, terminal flange means for releasably securing the coupling assembly to a fluid conduit on said transport vessel, and a pipe swivel joint assembly interconnecting said pipe section and said terminal flange means, said pipe swivel joint including inner and outer conduit elements rotatably interconnected by rollable bearing means, said pipe swivel joint further including packing means for establishing a fluid-tight dynamic seal between said inner and outer conduit elements, and packing retainer means removably securable to said terminal flange means to facilitate servicing said packing means without further disassembly of said swivel joint, and wherein the packing retainer means, the outer conduit element, and the inner conduit element together form an annular packing chamber for the packing means, and wherein said inner conduit element of said swivel joint is secured to said pipe section of said coupling assembly, and said outer conduit element of said swivel joint is secured to said terminal flange means to reduce the axial length and overall weight of said coupling assembly as compared with a coupling assembly of the same size but with the positions of the swivel joint conduit elements reversed.

4,022,499

TUBE RETAINING COMPRESSION FITTING

Paul M. Holmes; Charles F. Crissy, both of Jackson, and Douglas M. Brant, Grand Rapids, all of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Apr. 14, 1975, Ser. No. 567,591
Int. Cl.² F16L *25/00*
U.S. Cl. 285—328 8 Claims



1. In a compression fitting including a hollow body having an axis, an open end and a passage defined therein intersecting said end, a tube receiving recess defined in said body concentric to said passage intersecting said end for receiving a tube to be connected to said body, said recess being axially defined by a shoulder facing said open end, a ferrule engaging surface defined on said body within said recess, a ferrule within said recess in radial alignment with said surface and ferrule compression means mounted upon said body engaging said body, the improvement comprising tube retainer means axially located in said recess between said recess shoulder and ferrule having at least one tube engaging member extending toward said axis for engaging and axially retaining a tube inserted into said recess prior to compression of said ferrule by said ferrule compression means, said tube retainer means comprising an annular sleeve having a wall of thin radial wall thickness defined in said tube receiving recess adjacent said shoulder having a plurality of biased tube engaging projections circumferentially spaced on said sleeve wall, said projections comprising tabs lanced from said sleeve wall having a first end deflected from the configuration of said sleeve wall and a free second end defining an edge adapted to embed within a tube upon attempted axial removal of a tube from said recess, said tabs extending in an axial direction and said free end being disposed toward said shoulder.

4,022,500

ADHESIVE CONNECTION FOR PLASTIC PIPES

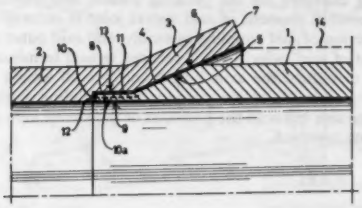
Paul Christiaan Herman van den Beld, Hardenberg, Netherlands, assignor to Wavin B.V., Zwolle, Netherlands

Continuation of Ser. No. 464,684, April 26, 1974, abandoned. This application July 1, 1975, Ser. No. 592,174

Claims priority, application Netherlands, Apr. 27, 1973, 7305984

Int. Cl.² F16L *25/00*

U.S. Cl. 285—332 **3 Claims**



1. Pipe connection for fiber reinforced synthetic plastic pipe made of thermosetting resin comprising a female pipe part with a tapered widened end and a male pipe part, the inside of the widened end tapering conically from the free end thereof to connect to a longitudinally extending cylindrical recess in the inner wall of the female pipe part, the tapered inner surface being a continuation of said cylindrical recess, said male pipe part having an axial protruding part along its inner wall conforming to said cylindrical recess and an outer conical end face extending continuously away from the outer surface of said protruding part and conforming to the conical shape of the inside of said widened end of the female pipe part, the length of the protruding part being greater than the length of the recess, and a glue layer between the conical end face of the male pipe part and the opposite face of the female pipe part and extending from the inside of the pipe connection as far as the outside of the male pipe part to connect said male and female pipe parts, said protruding part consisting of an inner, chemically resistant, layer of a fiber reinforced synthetic resin pipe and the outer face of said protruding part has a fiber reinforcement to reduce seepage of liquid from the inner side of the pipe connection to exposed cut surfaces of fibers on the conical end face of said male pipe part whereby the risk of corrosion to the fiber reinforced pipe is minimized.

4,022,501

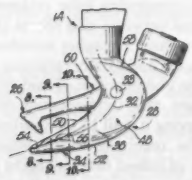
KNOTTER MECHANISM BILL HOOK

Allen A. White, Peabody, Kans., assignor to Hesston Corporation, Hesston, Kans.

Filed Aug. 2, 1976, Ser. No. 710,718

Int. Cl.² B65H *69/04*

U.S. Cl. 289—11 **4 Claims**



1. In a bill hook having prolonged stationary and movable jaws which are cooperable during rotation of the hook to tie a knot in a pair of adjacent strands, the improvement comprising:

a transversely bulbous toe on said stationary jaw; and

a transversely constricted neck on said stationary jaw immediately behind said toe,

said stationary jaw having a longitudinally concave, normally upper surface and a longitudinally convex, normally lower surface, said surfaces converging as the toe is approached,

said toe protruding laterally outwardly in opposite directions from said neck and being skewed with respect to the longitudinal axis of the jaw, having a trailing protrusion on the trailing side of the jaw set back with respect to a leading protrusion on the leading side of the jaw,

said protrusions having a common, transversely rounded, forwardmost edge which recedes as the trailing protrusion is approached,

the circumference of said stationary jaw from said neck to said forwardmost edge being at least as small as its circumference at said neck notwithstanding said bulbous configuration of the toe.

4,022,502

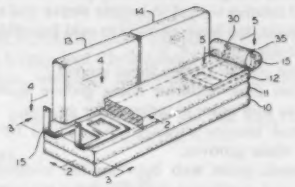
ARM OR CUSHION SUPPORT FOR FURNITURE

David Lynn Smith, and Mary B. Lupton, both of Chicago, Ill., assignors to Plurielle, Inc., Chicago, Ill.

Filed Dec. 22, 1975, Ser. No. 643,519

Int. Cl.² A47C *7/54*

U.S. Cl. 297—414 **11 Claims**



1. A cushion support comprising a ladder back frame having a long straight part, a curved part and a short straight part, said long straight part fitting under and held in place by a seat cushion, said seat cushion having dimensions which generally conform to the human anatomy in a seated position, said curved part extending out and around said seat cushion, and said short straight part being upturned and rising to a height which is a convenient arm height, with respect to the upper side of said cushion, cushion means supported by said upturned short part, wherein said cushion means comprises a foam material having pockets formed therein, said pockets being shaped, dimensioned and spaced to removably slip over and latch onto said upturned short ends.

4,022,503

PORTABLE SECURITY LOCK

Henry A. Bey, Box 88, Breckenridge, Minn. 56520

Filed Oct. 16, 1975, Ser. No. 622,807

Int. Cl.² E05C *17/36*

U.S. Cl. 292—264 **2 Claims**

1. A portable security lock for a swinging door comprising:

a first member having a hook on one end for engagement in a striker plate, said first member made from material having sufficient thinness so as to fit between the striker plate and the edge of the door when the door is in a closed position;

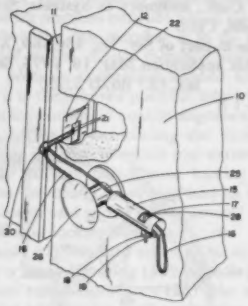
a chain connected to said first member, said chain operable for fastening around a doorknob;

a fastening member for attaching to said chain, said fastening member including an open ended cylindrical member comprised of a section of conduit;

said cylindrical member having a portion of said chain passing therethrough;

said fastening member including a chain gripping member

comprising an eye bolt and a knurled nut located thereon for fastening said chain to said cylindrical member so that said chain can be shortened by sliding said cylindrical

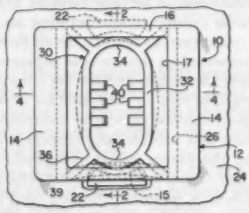


member toward said first member, said chain gripping member operable for securely holding the chain within said cylindrical member to prevent a door from being opened.

4,022,504
LATCH RECEPTACLE

Bruce W. Anderson, Arlington Heights, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 648,063, Jan. 12, 1976, abandoned. This application Mar. 15, 1976, Ser. No. 666,821
Int. Cl.² E05B *15/02*
U.S. Cl. 292—340 **9 Claims**

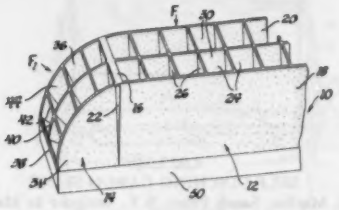


1. A one-piece plastic latch adapted to project through and be axially telescoped into and mounted in an opening in a panel and adapted to receive in said latch a projecting strike, said latch including an apertured head, a pair of spaced retaining legs extending axially from said head, said legs each having engaging means spaced from and in opposition to the head for engaging the panel, an oval axially disposed resilient tubular means located between and in spaced relation to said legs and spaced from said head and having an open oval bore positioned in alignment with said head aperture, said tubular means being supported in spaced relation to said head and legs by one or more spaced support means located at each of the opposite end walls of said oval tubular means, spaced means positioned within said tubular means for impinging on the strike when it projects through said head aperture into said tubular means, said tubular means being substantially flat along its elongated side walls which are interconnected by curved end walls, said support means including axially extending flanges which are angularly disposed relative to the long axis of said oval with at least one flange extending outwardly from adjacent an axial line on each of the curved end walls where each said curved end wall meets one of said elongated side walls, the end of said flanges having a limited connection to said head whereby said flanges can absorb a tortional stress at said connection thereby permitting deformation of said tubular member at its curved end walls as well as its elongated side walls during insertion of said strike, but said flanges maintaining the tubular means in relatively fixed spaced relation to said head and said legs.

4,022,505
ENERGY ABSORBING CELLULAR MEDIA FOR VEHICLES

John S. Saczawa, Jr., Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1975, Ser. No. 636,209
Int. Cl.² B60R *19/08*
U.S. Cl. 293—71 R **3 Claims**

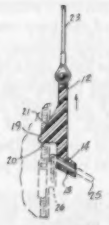


1. A resilient one piece energy absorbing grid of plastic material for a vehicle bumper, a rigid support having a planar surface for supporting said grid, said grid comprising first and second grid portions disposed adjacent to each other, each of said grid portions having a plurality of longitudinally extending cells extending in a first axial direction and having common walls therebetween, live hinge means interconnecting said first and second portions adjacent to one end thereof and forming a pivot axis therefor, said portions being spaced from one another so that said portions can be turned relative to one another on said pivot axis and mounted on said planar surface whereby the axial orientation of said cells of one of said portions is varied with respect to the axial orientation of the cells of the other of said portions and with respect to said planar surface.

4,022,506
ZIPPER OPERATOR

James R. Cloud, Sr., P.O. Box 339, Barnesville, Ga. 30204

Filed Feb. 27, 1976, Ser. No. 662,000
Int. Cl.² A44B *19/00*
U.S. Cl. 294—1 A **7 Claims**



1. A zipper operating device for closing and opening a zipper having a sliding tab operator and disposed on the back of a wearer, comprising an elongated body member having flat, parallel, inner and outer sides and adapted to be pulled vertically upward to close the zipper with the inner side adjacent a wearer's body, a flexible cord attached to the upper end of the body member for pulling thereon to close a zipper, a slot at the lower end of the body member passing completely therethrough from the inner side at a downwardly and outwardly inclined angle, said slot being shaped to conformably

and slidably receive and hold a zipper sliding tab, a guard rib projecting inwardly from said inner side above said slot and engageable with an undergarment of a zipper wearer between the teeth of the zipper when the body member is pulled upwardly along a zipper with the zipper tab engaged in said slot, said body member being adapted to be turned and pulled downwardly to open a zipper with the inner side again adjacent a wearer's body, the zipper tab being again engaged in and held in said slot but said guard rib engaging the closed zipper teeth and projecting a sufficient distance from the inner side to move the body member out of a vertical plane and cause said slot and tab to be inclined upwardly and outwardly to permit zipper opening with downward pull on the body member.

4,022,507

SELF-CINCHING CARGO SLING

Frank J. Marino, Sands Point, N.Y., assignor to Marino Systems, Inc., New York, N.Y.

Filed Mar. 17, 1976, Ser. No. 667,858
Int. Cl.² B66C *1/18*
U.S. Cl. 294—74 **16 Claims**

1. A self-cinching cargo sling adapted to encircle and supportingly engage a load to facilitate the lifting thereof and characterized by high strength, and the ability to resist the release of the cinched relationship about the load after the cinching or lifting force is released, and comprising

a unitary elongate flexible load bearing member having a medial portion and an outer portion on each side of said medial portion, said medial portion being disposed in a loop, and said outer portions extending in opposing paths along the periphery of the loop and such that each outer portion has a first segment intimately contacting a portion of the periphery of the loop and a second segment extending to a terminal point positioned outwardly beyond the side of the loop which is opposite said intimately contacting portions, and with said first segments collectively extending along about one-half the periphery of the loop when the sling is in its operative position about the load, and

means operatively associated with the load bearing member for maintaining said intimately contacting portions in a relatively slideable, contiguous relationship to thereby achieve a frictional engagement therebetween and comprising a sleeve enclosing substantially the full extent of said intimately contacting portions,

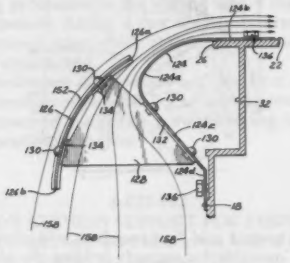
whereby the loop may be positioned to encircle a load, and a lifting force exerted on each of the outer portions from the associated terminal point to draw the loop into cinching relationship about the load and such that the frictional engagement between the intimately contacting portions serves to resist the release of the cinching force upon the release of the lifting force.

4,022,508

AIR DRAG REDUCING MEANS FOR BLUFF VEHICLES AND THE LIKE

Jeffrey W. Kirsch, La Jolla, and Edward A. Day, Rancho Santa Fe, both of Calif., assignors to Systems, Science and Software, La Jolla, Calif.

Continuation-in-part of Ser. No. 456,469, April 1, 1974, abandoned. This application Mar. 10, 1975, Ser. No. 554,751
Int. Cl.² B62D *35/00*
U.S. Cl. 296—1 S **15 Claims**



1. Means for reducing air drag on a bluff vehicle having a forward generally vertically disposed bluff surface against which air impinges when the vehicle is moved in a forward direction, said bluff surface intersecting longitudinally rearwardly extending top and lateral surfaces to define upper horizontal and side vertical substantially right angle corner edges, the air impinging said bluff surface forming an air stagnation area from which the air passes radially outwardly around said corner edges, said air drag reducing means comprising, in combination, an airvane member having a generally arcuate transverse configuration defining an inner concave surface and an outer convex surface, an air flow guide element adapted to be mounted on said vehicle adjacent at least one of said right angle corner edges and having a length substantially equal to the length of said airvane, said air flow guide element defining an outer convex curvature extending forwardly of said bluff surface and substantially disposed within an envelope defined by the planes of said longitudinally rearwardly extending top and lateral surfaces of the vehicle when said air flow guide element is mounted thereon, and means securing said airvane member in spaced relation to said air flow guide element so that said inner concave surface faces said air flow guide element and a leading edge of said airvane member is disposed within said envelope when said air flow guide element is mounted on said vehicle, said airvane member also having a trailing edge and cooperating with said air flow guide element to define a rearwardly converging air flow passage therebetween having air entrance and exit areas extending the full length of said airvane member and air flow guide element, said air passage being adapted to receive air passing from said bluff surface and cause air passing through said air flow passage to increase in velocity and be maintained in attached relation to the longitudinally rearwardly extending surface of the vehicle leeward of said trailing edge of said airvane member and provide a net forward thrust on said air drag reducing means.

4,022,509

LOCKING PIN ACTUATOR MEANS FOR A TILT CAB VEHICLE

Robert D. Bopp, and David P. Klosterman, both of Moberly, Mo., assignors to Orschein Brake Lever Mfg. Company, Moberly, Mo.

Filed Dec. 1, 1975, Ser. No. 636,420
Int. Cl.² E05C *1/06*; B62D *27/06*
U.S. Cl. 296—28 C **8 Claims**

1. In a tilt cab locking apparatus for releasably locking to a

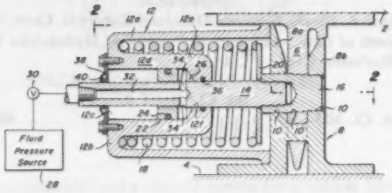
vehicle chassis member a pivotally connected tilt cab member, including blade and blade housing members arranged between and adapted for connection with said cab and chassis members, respectively, said blade member being normal to the cab member and said blade housing member including a pair of parallel spaced leg portions between which said blade member is received when the cab member is in its normal lowered position relative to the chassis member, said blade member and said leg portions containing aligned locking openings when the cab is in the lowered position; a locking pin arranged normal to said leg portion in coaxial alignment with said locking openings; spring means biasing the locking pin axially toward a locking position in which one extremity of said pin extends axially through the aligned locking openings; and actuator means for axially displacing said locking pin against the biasing force of said spring means toward a released position relative to said locking openings;

the improvement wherein said actuator means comprises

a. a unitary actuator housing (12) including

1. an outer tubular portion (12*a*) one end of which is open and adapted for rigid connection with one blade housing leg portion in contiguous engagement with the outer surface thereof about the locking opening contained therein;

2. a first transverse wall portion (12*b*) connected with the other end of said tubular portion, said first wall portion containing a first opening (12*c*) aligned with said locking openings;



3. an inner tubular portion (12*d*) arranged in concentrically spaced relation within said outer tubular portion and connected at one end with the inner surface of said first transverse wall portion about said first opening contained therein; and

4. a second transverse wall portion (12*e*) connected at the other end of said inner tubular wall portion adjacent said blade housing member, said second transverse wall portion containing a second opening (12*f*) aligned with said first opening and with said locking openings;

5. said inner and outer tubular portions and said first and second transverse wall portions being integral;

6. said spring means comprising a helical spring arranged concentrically between said inner and outer tubular portions and in abutting engagement at one end with said first transverse wall portion;

b. an axially displaceable rod (14) extending longitudinally in concentrically spaced relation through said actuator housing inner tubular portion and through said second opening, one end of said rod being connected with said locking pin for axially displacing said pin relative to the locking openings; and

c. piston-cylinder motor means contained within said inner tubular portion for axially displacing said locking pin against the biasing force of said spring means toward the released position relative to said locking openings, said inner tubular portion defining the cylinder of said piston-cylinder motor means, the piston (22) of said motor means being connected with said rod to define a working chamber (26) arranged between said piston and said second transverse wall when said locking pin and said rod are in the locking position relative to said locking openings, and further including means for supplying pressure fluid to said working chamber to axially displace said piston and said rod toward the released position relative to the locking openings.

4,022,510

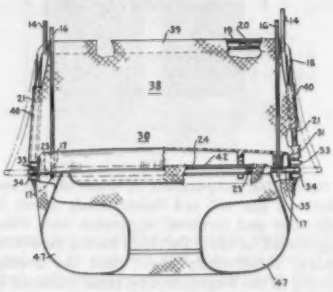
SEAT FOR BABY SWING

David Saint, Elverson, Pa., assignor to Graco Metal Products, Inc., Elverson, Pa.

Filed Nov. 5, 1975, Ser. No. 629,058

Int. Cl.² A47B *39/00*

U.S. Cl. 297—153 **6 Claims**



1. A seat for a baby swing comprising

a tray having an upper face and downwardly extending front and side edge portions,

a flexible frame member having opposite side sections with upper and lower angularly disposed portions,

said upper portions of said frame member being connected at the top and said lower portion having lower inturned end sections disposed below the top of the tray,

a hollow tubular frame member having ends, inwardly of and contiguous to the sides of the tray, for the reception of said inturned end sections,

a seat member of flexible sheet material having leg openings and having tubular portions in engagement with said flexible frame member and with said tubular frame member,

said tray having downwardly extending portions in gripping engagement with said second frame member and side edge portions through which opposite side sections of said frame extend,

front seat supports extending through said tray inwardly with respect to said side edge portions of the tray and in pivotal engagement with said inturned end sections.

4,022,511

RECOVERY OF LIQUID AND GASEOUS PRODUCTS FROM AN IN SITU OIL SHALE RETORT

Gordon B. French, Rifle, Colo., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Mar. 10, 1975, Ser. No. 556,577

Int. Cl.² E21C *41/10*; E21B *43/00*

U.S. Cl. 299—2 **21 Claims**

1. An in situ oil shale retort system for conversion of kerogen in oil shale to liquid and gaseous products by passing a gas from a gas inlet end to the product outlet end of said retort, through a retorting zone therein, in a direction to advance the retorting zone through said in situ retort toward the product outlet end thereof, comprising:

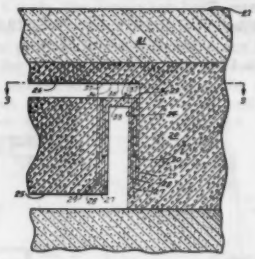
an in situ oil shale retort chamber in a subterranean oil shale deposit bounded on all sides by unfragmented deposit and having a gas inlet end and a product outlet end;

fragmented oil shale particles in said chamber;

a gas inlet communicating with the interior of said chamber at said gas inlet end of said chamber through which gas can be introduced into said chamber;

a product collection zone communicating with the interior of said chamber at said product outlet end of said chamber having apparatus therein for collecting and removing liquid and gaseous products from the chamber; and

a retort off gas cooling zone at the product outlet end of the in situ retort chamber having sufficient thermal capacity



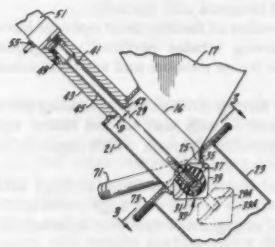
to reduce the temperature of retort off gas such that said retort off gas will not deleteriously affect the product collection and removal apparatus and which contains fragmented oil shale particles having an average kerogen content substantially lower than the average kerogen content of the fragmented oil shale particles in the in situ oil shale retort chamber.

4,022,512

PNEUMATIC CONVEYORS

Oscar N. Autelli, Arcadia, Calif., assignor to Whitlock, Inc., Farmington, Mich.

Filed Jan. 26, 1976, Ser. No. 652,472
Int. Cl.² B65G 53/04
U.S. Cl. 302—26 **6 Claims**



1. Pneumatic conveyor apparatus for supplying particulate material directly from a supply source into a conveyor conduit, in successive plugs separated by intervening gas-filled spaces, comprising:

a housing defining a material take-off chamber connected by an internal port through a separation wall to a pressurizing chamber, the internal port having a material flow valve seat facing inwardly toward the pressurizing chamber, the housing having an inlet port connecting the supply source to the take-off chamber and an open outlet port connecting the pressurizing chamber directly to the conveyor conduit;

a valve rod extending from the pressurizing chamber through the internal port and through the take-off chamber and having an elongated extension projecting outwardly of the take-off chamber;

a valve closure member mounted on the end of the valve rod in the pressurizing chamber;

a linear actuator, connected to the outer end of the valve rod, for actuating the valve rod axially between a closed position in which the valve closure member engages the valve seat to close the internal port against a flow of particulate material, and an open position in which the valve closure member, is displaced from the valve set to open the internal port to a flow of particulate material;

main gas supply means for introducing high pressure gas into the pressurizing chamber, adjacent the internal port;

control means for cyclically energizing the actuator to alternately open and close the internal port, the control means including means to actuate the main gas supply only when the internal port is closed;

a cylinder encompassing the valve rod extension, between the actuator and the take-off chamber, defining an annular air space of limited radial dimension encompassing the valve rod extension, the air space having an inner end opening into the take-off chamber and a closed outer end;

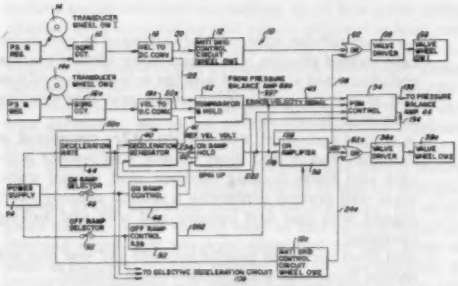
and auxiliary gas supply means, employing the same gas as the main gas supply means, for continuously supplying gas under pressure into the outer end of the air space, to preclude accumulation of particulate material in the air space and to aid the flow of particulate material through the internal port into the pressurizing chamber.

4,022,513

SELECTIVE DECELERATION BRAKE CONTROL SYSTEM

Edgar A. Hirzel, Granada Hills, and Robert D. Cook, Newhall, both of Calif., assignors to Crane Co., Hydro-Aire Division, Burbank, Calif.

Filed Apr. 12, 1972, Ser. No. 243,251
Int. Cl.² B60T 8/02
U.S. Cl. 303—93 **48 Claims**



39. A brake control system for applying and controlling a brake application means for a wheel of a vehicle independently of operator brake application comprising:

signal generating means for producing a first signal that is proportional to the speed of said wheel;

reference generating means for generating a velocity reference signal having a selectively variable rate of decrease;

rate selector means for manually selecting a rate of decrease of said reference velocity signal indicative of a desired rate of vehicle deceleration;

comparison means for comparing said first signal with said reference signal for generating an error signal indicative of the difference between said first signal and said reference signal; and

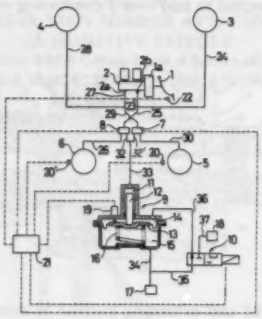
control means for providing a signal to said brake application means to apply brake pressure to said wheel independently of operator brake application and responsive to said error signal to provide a selected deceleration brake control signal for controlling said brake pressure in order to maintain said desired rate of deceleration.

4,022,514

ANTI-SKID BRAKE CONTROL SYSTEM

Toshiyuki Kondo, and Takashi Nagashima, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Dec. 9, 1975, Ser. No. 639,032
Claims priority, application Japan, Dec. 19, 1974, 49-146090; Dec. 20, 1974, 49-147214; Dec. 27, 1974, 50-3952; May 14, 1975, 50-57651
Int. Cl.² B60T 8/00, 13/68
U.S. Cl. 303—115 14 Claims



1. An anti-skid brake control system for a vehicle having a plurality of independent fluid brake circuits, comprising:

a master cylinder for supplying fluid under operator-controlled pressure to said plurality of fluid brake circuits and having a plurality of outlets;

first and second fluid brake circuits connected respectively to first and second outlets of said master cylinder and each circuit having at least one wheel brake means and a corresponding wheel;

first and second change over valve means interposed between said first outlet of said master cylinder and said wheel brake means of said first brake circuit and between said second outlet of said master cylinder and said wheel brake means of said second brake circuit, respectively, and each change over valve means being operable for controlling the fluid communication therebetween;

a single pressure reducing means including a single pressure reducing chamber connected to said first and second change over valve means, a single pressure reducing piston slidably disposed within said pressure reducing chamber for increasing and decreasing the capacity thereof, and a single servo actuator said reducing piston;

first and second sensing means for sensing rotational conditions of wheels associated with said wheel brake means of said first and second brake circuits respectively, each sensing means generating an output signal in response to the rotational condition of the corresponding wheel of said wheel brake means; and

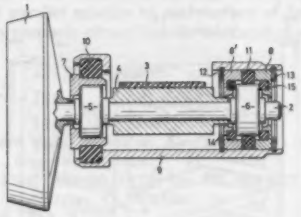
a computer means electrically connected to said first and second change over valve means, and to said servo motor of said pressure reducing means, said computer means generating and transmitting first, second, and third signals to said first and second change over valve means and said servo actuator, respectively, upon receipt of said output signals from said first and second sensing means.

4,022,515

SUPPORT MEANS FOR TEXTILE SPINDLES AND ROTORS HAVING ANTI-FRICTION BEARINGS

Hans Hermanns, Elfershausen; Manfred Kress, Grafenrheinfeld; Friedrich Schuster, and Kurt Schwabe, both of Hammelburg, all of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Dec. 2, 1975, Ser. No. 637,011
Int. Cl.² F16C 19/10
U.S. Cl. 308—152 10 Claims



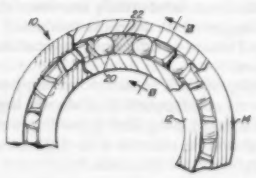
1. An assembly comprising a rotatable shaft having a load carrying end and an opposite end, first and second longitudinally spaced anti-friction bearings supporting the shaft with the first bearing nearest the load carrying end and thereby supporting a heavier load than the second bearing, housing means about the bearings, and means for supporting the bearings in the housing means comprising an elastic member disposed between each of the bearings and the housing means, the elastic member disposed between the first bearing and the housing means being adapted to support a heavier load than the elastic member disposed between the second bearing and the housing means.

4,022,516

BEARING SPACER AND METHOD

Robert L. Smith, Chandler, and Joseph A. Goodrich, Tempe, both of Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Sept. 24, 1975, Ser. No. 616,340
Int. Cl.² F16C 1/24
U.S. Cl. 308—199 12 Claims



1. An antifriction bearing comprising:

an axially extending outer circular bearing race;

an axially extending inner circular bearing race concentric with said outer race;

a plurality of bearing members arranged between said bearing races;

a plurality of cylindrical spacers each having a circumferentially extending cylindrical surface and opposed end walls, said spacers being interposed between said bearing members with said end walls adjacent said bearing members, said cylindrical spacers being formed of a substantially incompressible material having lubricative qualities; and

a projection on each of said spacers extending axially from said cylindrical surface, said projection having upper and

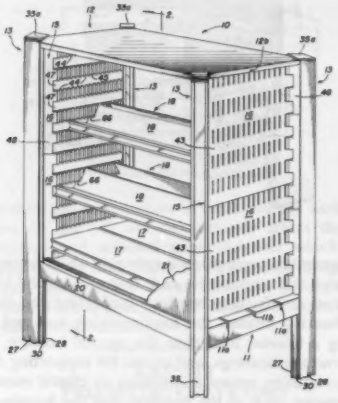
lower axially extending surfaces respectively engageable with said outer and inner races.

4,022,517

DISPLAY CASE FOR SMALL ARTICLES

Ronald P. Eckert, Northbrook, Ill., assignor to Amity Leather Products Company, West Bend, Wis.

Filed Dec. 8, 1975, Ser. No. 638,704
Int. Cl.² A47B *43/00, 87/00*
U.S. Cl. 312—257 R 36 Claims



1. A display case for small articles comprising, in combination:

a cabinet which includes four corner posts, and a floor and a top which are of predetermined width from front to rear, said posts, floor and top defining end openings;

molded plastic end panel means at each end of said cabinet closing said end openings, each of said end panel means having a plurality of vertically spaced, horizontal rows of inwardly projecting, integral, closely spaced lugs, the lugs in each row defining a series of closely spaced vertical slots and said lugs and slots in one end panel means being aligned with those in the other end panel means, the lugs and slots in each of said horizontal rows defining means for supporting shelf means which may be of various widths and for restraining said shelf means against front to rear movement, whereby a plurality of such shelf means which are substantially narrower than the cabinet may be supported at different levels and with said narrower shelf means at different distances from the front of the cabinet;

and a plurality of shelf means extending between said end panel means and supported on aligned lugs therein, each said shelf means having first depending web means seated in aligned slots to restrain said shelf means, and having depending second web means.

4,022,518

ELECTRICAL ROTARY COAXIAL CONNECTOR

Yvon Gattaz, 6, rue Carnot, 93220 Gagny, France

Filed June 4, 1976, Ser. No. 692,661
Claims priority, application France, June 10, 1975, 75.18026
Int. Cl.³ H01R *39/00*
U.S. Cl. 339—8 R 9 Claims

1. Rotary electrical coaxial connector for high-frequency transmission of wavelength λ between a fixed coaxial conductor and a coaxial conductor capable of rotating with respect to said fixed conductor, said connector being provided with a fixed part and a rotating part, characterized in that one of said parts, fixed in a cylindrical casing (3), comprises:

a circumferential conducting piece (5) seated and kept in said casing (3) and comprising a first cylindrical section (6), a second cylindrical section (7) which is thicker and of lesser inside diameter and which follows the first section, and a very short inside shoulder (9) at the end of the second section (7);

an outside conducting casing connector (10) extending said shoulder;

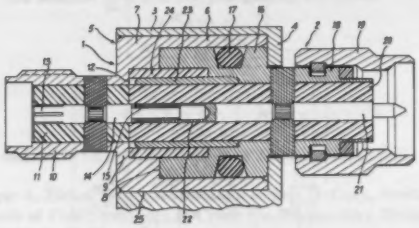
an insulating layer (11) in said casing (10);

an inside connecting conductor (13) in said layer; and in that the second part comprises:

a circumferential conducting piece (16) seated in rotary manner in said first cylindrical section (6) and touching along its entire length the inside cylindrical surface of said first section;

an external conducting connector shell (18) of lesser diameter;

an inside conducting cylindrical shell (23) solidly and rigidly connected to said rotary conducting circumferential



piece (16) and extending parallel to same and on the inside towards the shoulder of the other part;

an insulating layer (20) in said conducting connector shell (18);

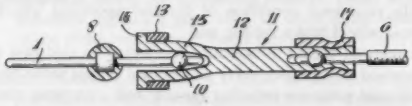
an inside connecting conductor (21) in said layer (20), the two inside conductors of the first and second parts extending by a complementary set of pin-receptacle (14,22) with interposition between the respective outside and inside surfaces of pin and receptacle of a thin insulating film (15) the length of which is essentially equal to λ/4, the cylindrical shell (23) and said rotary conducting circumferential piece (16) seating between them an insulating shell (24) with which they make contact over a length of 3λ/4, said insulating shell (24) also making contact with the second cylindrical section (7) and said shoulder (9) over a length of λ/4, an insulating layer (20) being placed between the pin-receptacle set (14,22) and the rotary, condcuting circumferential piece (16) with its shell (23).

4,022,519

HEAT RECOVERABLE CONNECTION

Frederick William Leslie Hill, Lechlade, England, assignor to Raychem Limited, London, England

Filed May 14, 1975, Ser. No. 577,461
Claims priority, application United Kingdom, May 14, 1974, 21369/74
Int. Cl.² H01R *13/20*
U.S. Cl. 339—30 10 Claims



1. A reusable connector comprising a first member, at least part of which is non-resilient and deformable, a second member made from a memory metal capable of reversing between

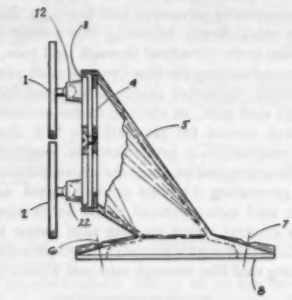
a martensitic state and an austenitic state, and a third, object member adapted to be engaged with said first member to form a connection, said object member having a portion adapted to deform said first and second members when the memory metal is in its martensite state upon engagement of the object member with or its withdrawal from said first member, the arrangement of said first and second members being such that when the object member is engaged with the first member to deform said first and second members, and the memory metal warmed above the temperature which it becomes austenitic, recovery of the second member towards its original configuration forces the deformable portion of said first member into secure engagement with said object member to complete the connection.

4,022,520

OUTSIDE REAR VIEW MIRROR ATTACHMENT FOR AUTOMOTIVE VEHICLE

Robert D. Scifres, 6955 Given Road, Cincinnati, Ohio 45243

Filed Sept. 4, 1975, Ser. No. 610,382
Int. Cl.² G02B *5/08*
U.S. Cl. 350—304 **1 Claim**



1. An outside rear view mirror assembly adapted to be mounted on a motor vehicle and comprising
   - a mounting arm for attachment in fixed relation to the side of the motor vehicle,
   - a disc angularly adjustable relative to said arm about a generally horizontally axis which is generally parallel to the path of travel of the motor vehicle,
   - means for holding said disc in a fixed adjusted position relative to said arm,
   - first and second flat mirrors and
   - ball joint means mounting said mirrors on said disc for independent, angular adjustment relative to said disc,
   - whereby the desired relative angles between the two mirrors may be established to obtain a combined field of vision which essentially eliminates blind spots from the rear of the motor vehicle and with the two mirrors in a desired relative position to each other.

4,022,521

MICROSCOPE SLIDE

Raymond V. Hall; Larry J. Harmsen, both of Edina, and Robert E. Isleifson, Minneapolis, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 19, 1974, Ser. No. 443,661
Int. Cl.² G02B *21/34*
U.S. Cl. 350—95 **12 Claims**

1. A specimen slide for the microscopic examination of a fluid biological sample comprising:
   - a substantially flat first member having a surface provided with a plurality of integral microprojections spaced thereon in a predetermined pattern and extending a substantially equal distance therefrom, wherein said projections are spaced in a manner which allows the free flow of a fluid sample in all directions therebetween

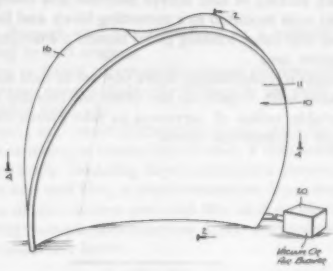
   - and a substantially flat second member having a surface adapted to be supported on said microprojections in spaced parallel relation to said surface of first member thereby precisely controlling the thickness of said sample.

4,022,522

PROJECTION SCREEN

Lloyd Howard Rain, Lexington, Ky., assignor to Irvin Industries, Inc., Greenwich, Conn.

Filed June 30, 1975, Ser. No. 591,627
Int. Cl.² G03B *21/56*
U.S. Cl. 350—117 **6 Claims**



1. A free-standing, self-contained, mobile projection screen comprising:
   - a rigid frame,
   - a plurality of stays having their ends attached to and supporting said frame,
   - a continuous tailored membrane having a back surface and a front viewing surface,
   - a second continuous membrane spaced from said back surface of said first membrane,
   - said first membrane and said second membrane being connected to form an envelope enclosing said frame and stays and defining a single chamber, and
   - means in communication with said chamber to maintain a differential pressure between the atmosphere in said chamber and the ambient atmosphere,
   - said first membrane being drawn taut when said differential pressure is maintained to provide a viewing surface configuration determined solely by the predetermined tailoring of said membrane,
   - said back surface of said first membrane, when drawn taut, being in contact solely with said atmosphere in said chamber.

4,022,523

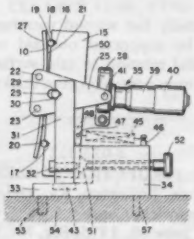
ADJUSTABLE FOCAL LENGTH CYLINDRICAL MIRROR ASSEMBLY

Laurie R. Lindonen, and Curtis P. VanVloten, both of Cambridge, Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed Jan. 26, 1976, Ser. No. 652,131
Int. Cl.² G02B *5/10*
U.S. Cl. 350—295 **17 Claims**

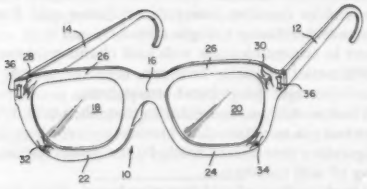
1. An adjustable focal length cylindrical mirror assembly comprising, in combination

a. a spring mirror member having an optically reflective front surface and a back surface;
b. a set of two inner loading point means for contacting said front surface of said mirror member comprising parallel rods between two parallel, spaced yokes;
c. a set of two outer loading point means spaced from and outside said inner loading point means contacting said



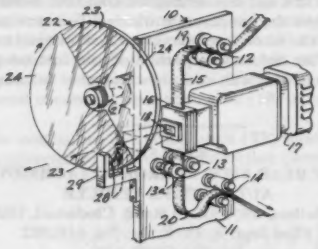
back surface of said mirror member and comprising parallel rods mounted in a mounting block and forming with said two inner loading point means a four-point support system; and
d. means to controllably move one set of said loading point means with respect to the other set thereby to impart a variable radius of curvature to said mirror member and form a cylindrical mirror.

4,022,524
EYEGLASS FRAME
Cesare Florio, 2581 SW. 7th St., Fort Lauderdale, Fla. 33312
Filed Oct. 31, 1975, Ser. No. 627,677
Int. Cl.² G02C *1/00*
U.S. Cl. 351—83 **4 Claims**



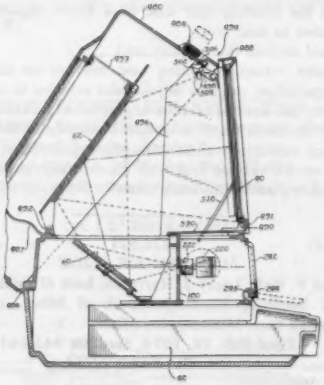
1. An eyeglass frame for a pair of lenses comprising a main frame having a normally substantially planar front surface and defining a pair of apertures each adapted to receive a lens, a pair of ear pieces integral with said main frame on a far side thereof, said main frame further including two pair of raised protrusions on said surface and each being adjacent one of said apertures, said raised protrusions being out of planar alignment with said surface, each pair being disposed on the far side of said frame and being operative to raise said frame when said surface is in substantially parallel contact with a support, each of said protrusions being arcuate in shape and of non-uniform cross-section, a portion of said protrusion at the largest cross-section being operative to contact said support and keep said lenses above the same when said surface is substantially parallel thereto.

4,022,525
INTERMITTENT FILM DRIVE FOR MOTION PICTURE PROJECTOR
Angelo Boudouris, Sylvania, Ohio, assignor to Eprad Incorporated, Toledo, Ohio
Filed Sept. 29, 1975, Ser. No. 617,519
Int. Cl.² G03B *1/24*
U.S. Cl. 352—187 **7 Claims**



1. A motion picture projector having a gate through which film is incrementally advanced and having a shutter which is rotated for periodically blocking the projected picture to allow the film to be advanced through said gate, an improved transport for advancing the film through such gate comprising, in combination, sprocket means positioned for moving the film through said gate, an electric motor connected to rotate said sprocket, means for generating a first signal after said shutter is rotated to a predetermined position completely blocking the projected picture, means responsive to said first signal for generating a motor control signal, and means responsive to said motor control signal for driving said motor, said motor control signal causing said motor to rotate said sprocket means through a predetermined rotational increment for advancing said film through said gate by one picture frame.

4,022,526
PORTABLE FILM STRIP PROJECTOR
Frank C. Badalich, Chicago, and George J. Pawl, Norridge, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.
Filed Jan. 9, 1975, Ser. No. 539,832
Int. Cl.² G03B *21/28*
U.S. Cl. 353—78 **14 Claims**



1. A portable film strip projector which includes a light source and means for projecting an image, comprising:
a cabinet having a base for mounting the light source and the projection means;
a collapsible cover pivotally mounted to the base for move-

ment between a closed position for storage and an open position for viewing a film strip to provide a self-contained projector;

a projection screen pivotally mounted to the base for movement between the closed and viewing positions; and

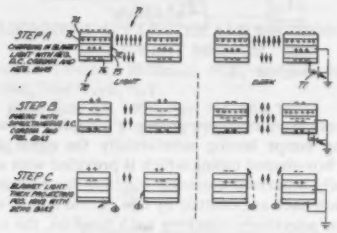
a reflective mirror pivotally mounted to the base for movement between the closed and viewing positions, a movable end of said mirror being connected to said cover for movement therewith and to support the mirror in said viewing position at an angle required to subtend the angle between the projection screen and the direction of travel of the projected image to reflect the image from the projection means onto the rear of the screen.

4,022,527

ION MODULATOR HAVING INDEPENDENTLY CONTROLLABLE BIAS ELECTRODE

Jerome Edward Jackson, Shaker Heights, Ohio, assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Filed May 29, 1975, Ser. No. 581,724
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **4 Claims**



1. A process for producing copies of a graphic original comprising the steps of:

1. applying an electrostatic charge to an ion modulator in blanket light while applying a bias potential of the same polarity as said electrostatic charge,
2. projecting upon said ion modulator a pattern of light and shadow corresponding to said graphic original while applying an AC corona and a bias potential of a polarity opposite to that of said electrostatic charge,
3. flooding said ion modulator with blanket light,
4. projecting ions of the opposite polarity to that of said electrostatic charge in blanket light with zero bias potential applied, whereby ions are transmitted through said modulator in a pattern corresponding to said original,
5. creating a latent electrostatic image corresponding to said pattern upon a dielectric surface in the path of said transmitted ions, and
6. developing said latent electrostatic image, said ion modulator comprising a conductive screen, a thin metal film, an electrically insulating layer interposed between said screen and said film, a photoconductive layer overcoating one of said screen and said film and an electrically insulating non-photoconductive layer overcoating said photoconductive layer.

4,022,528

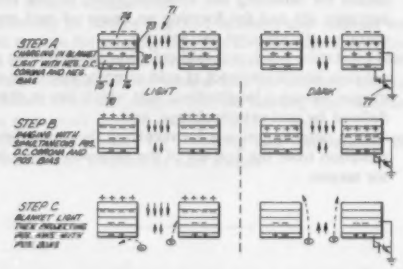
ION MODULATOR HAVING INDEPENDENTLY CONTROLLABLE BIAS ELECTRODE

Jerome E. Jackson, Shaker Heights, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed May 29, 1975, Ser. No. 581,723
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **9 Claims**

5. A process for producing copies of a graphic original comprising the steps of:

1. applying an electrostatic charge to an ion modulator in blanket light while applying a bias potential of the same polarity as said electrostatic charge,
2. projecting upon said ion modulator a pattern of light and shadow corresponding to said graphic original while applying a DC corona of a polarity opposite to that of said electrostatic charge and a bias potential of the same polarity as said DC corona,
3. flooding said ion modulator with blanket light,
4. projecting ions of the opposite polarity to that of said electrostatic charge while applying a bias potential of the same polarity as that of said ions, whereby ions are transmitted through said ion modulator in a pattern corresponding to said original,
5. creating a latent electrostatic image corresponding to said pattern upon a dielectric surface in the path of said transmitted ions, and
6. developing said latent electrostatic image, said ion modulator comprising a conductive screen, a thin metal film, an electrically insulating layer interposed between said screeen and said film, a photoconductive layer overcoating one of said screen and said film and an electrically insulating non-photoconductive layer overcoating said photoconductive layer.

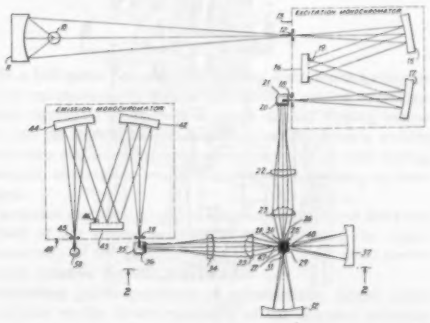


4,022,529

FEATURE EXTRACTION SYSTEM FOR EXTRACTING A PREDETERMINED FEATURE FROM A SIGNAL

John U. White, Contentment Island Road, Darien, Conn. 06820

Filed Dec. 11, 1975, Ser. No. 639,804
Int. Cl.² G01J *3/30, 3/42*
U.S. Cl. 356—85 **31 Claims**



1. Apparatus for measuring radiation from a sample, the apparatus comprising, in combination:

a source of radiation;

excitation monochromator means for isolating an excitation beam of monochromatic radiation from said source, the excitation monochromator means having an excitation entrance slit for receiving radiation from said source, an excitation exit slit, and means for directing the excitation beam through said excitation exit slit;

means cooperating with the excitation monochromator means for directing the excitation beam to said sample

and for forming an image of the excitation exit slit adjacent the sample;

emission monochromator means for isolating radiation from said sample, the emission monochromator means having an emission entrance slit for receiving an emission beam of radiation from said sample, an emission exit slit, and means for directing monochromatic radiation from the emission beam through said emission exit slit;

means cooperating with the emission monochromator means for directing the emission beam to the emission entrance slit and for forming an image of said emission entrance slit adjacent the sample;

said excitation beam and said emission beam having principal rays which intersect at said sample, and each of said images having a longitudinal axis which lies in the plane defined by said principal rays; and

radiation detecting means for receiving the monochromatic radiation from the exit slit of the emission monochromator means.

4,022,530

DEVICE FOR ATOMIZING A SAMPLE FOR FLAMELESS ATOMIC ABSORPTION MEASUREMENTS

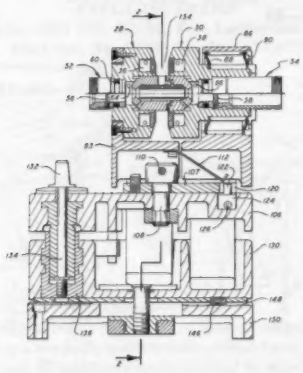
Klaus Braun; Wolfgang Chlosta; Franz Eier; Bernhard Werner Huber, all of Uberlingen, and Rolf Günther Arnold Tamm, Salem, all of Germany, assignors to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Germany

Continuation of Ser. No. 561,286, March 24, 1975, abandoned. This application Aug. 28, 1975, Ser. No. 608,558

Claims priority, application Germany, Mar. 22, 1974, 2413782

Int. Cl.² G01N *21/16*; G01J *3/30*

U.S. Cl. 356—85 **23 Claims**



1. Apparatus for flameless atomization of a sample for atomic absorption analysis comprising:

a. a hollow body of electrically conductive material defining a sample chamber having a radiation-transmissive passage therethrough; and

b. electrode means including portions in electrical contact with said hollow body at spaced locations for passing an electrical current through the body to cause heating thereof and further including portions substantially enveloping and spaced from said hollow body and completely shielding said hollow body against radiation.

4,022,531

MONOCHROMATOR

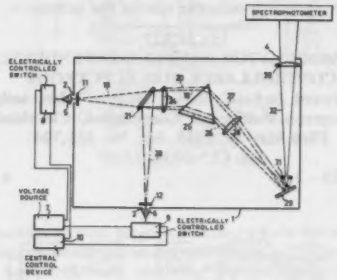
Svelto Orazio, Segrate; Cubeddu Rinaldo; Zagara Federico, both of Milan; Mengarelli Quirino, and Riccardi Clemente, both of Monza (Milan), all of of Italy, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 517,403, Oct. 24, 1974, abandoned. This application Dec. 4, 1975, Ser. No. 637,778

Claims priority, application Italy, Oct. 17, 1973, 30228/73

Int. Cl.² G01J *3/14*

U.S. Cl. 356—100 **6 Claims**



1. Monochromator, comprising a plurality of white-light producing lamps having substantially the same frequency range, a box-shaped casing which is provided with a plurality of spatially separated entrance windows for beams of white light which each are emitted by one of said lamps, electronic means for selectively switching each lamp on, the casing further containing a dispersing means disposed internally of the casing so that each of the said beams of white light is incident on the dispersing means for converting said beams into dispersed light in the form of separate beams of monochromatic light of various wavelengths, a beam splitter aligned with the path of the beams from the entrance windows and aligned with the dispersing means for directing the beams from each of the entrance windows to the dispersing means along diverging light paths, the casing being further provided with an exit window provided with a slit which is proportioned so that only one of the said beams of monochromatic light is transmitted, means being provided to direct the white light to the dispersing means at a particular angle of incidence so that dispersed light is obtained which is composed of beams of monochromatic light which are inclined to light beams of the same wavelength which are emitted by another lamp so that the identity and hence the wavelength of the selected beams of monochromatic light which emerge from the exit slit are varied in accordance with the identity of the particular lamp which is switched on.

4,022,532

SAMPLE POINT INTERFEROMETRIC SYSTEM FOR OPTICAL FIGURE MONITORING

Lucian Montagnino, Brookfield Center, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Aug. 13, 1975, Ser. No. 604,471

Int. Cl.² G01B *9/02*

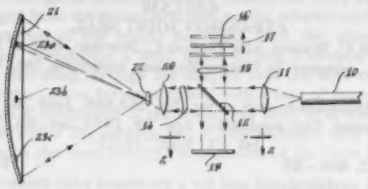
U.S. Cl. 356—109 **5 Claims**

1. A system for monitoring the figure of a surface by detecting shifts of at least two spaced sample points on said surface from predetermined positions thereof comprising:

light reflecting elements disposed respectively at said points,

each of said elements being individually oriented and constituted to reflect light to a preselected focal point disposed in a location independent of the radius of curvature of the surface being monitored,

each of said elements having a detectably different reflective capacity with respect to the adjacent portion of said surface with respect to said focal point,



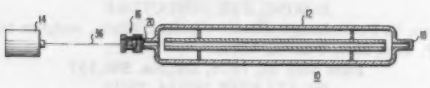
means including interferometer means and detecting means for directing a beam of light at said elements and comparing the intensity of the light reflected from one element with respect to the other elements.

4,022,533

LASER ALIGNMENT APPARATUS AND METHOD WITH AN ALIGNMENT MIRROR

Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,242
Int. Cl.² G01B *11/26*
U.S. Cl. 356—153 **7 Claims**



1. An apparatus for aligning a first mirror which includes a substrate on a laser tube so that it is parallel with respect to a second mirror on the laser tube comprising:

a first window having an index of refraction which matches that of the first mirror substrate; and means for connecting said first window to said first mirror substrate with said first window being exterior of the laser tube, said means for connecting including

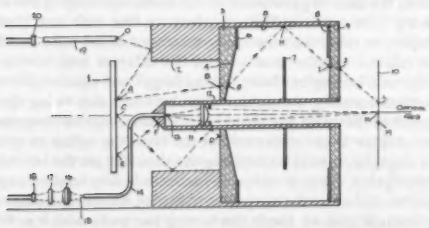
means for containing a fluid between the first window and said first mirror substrate and means for changing the position of said first mirror substrate with respect to the first window.

4,022,534

REFLECTOMETER OPTICAL SYSTEM

Stanley J. Kishner, Pomona, N.Y., assignor to Kollmorgen Corporation, Hartford, Conn.

Filed Mar. 23, 1976, Ser. No. 669,592
Int. Cl.² G01N *21/48*
U.S. Cl. 356—210 **12 Claims**



1. A reflectometer optical system having an optical aixs for illuminating a sample with flux derived from an extended source comprising:

a. a diffuser radially symmetric with respect to said optical axis and responsive to flux emanating from said source for diffusing said flux and refracting it radially outward from said optical axis;

b. a reflective surface intermediate said diffuser and said sample for reflecting said flux diffused by said diffuser, said reflective surface being radially symmetric with respect to said optical axis;

c. a plurality of baffles disposed between said diffuser and said sample for limiting said flux incident upon said sample to a small angular spread about 45°;

d. means located on said optical axis for focusing the flux reflected from said sample and for limiting said reflected flux to a small angular spread about 0°; and

e. a fiber optic bundle for receiving and transmitting the reflected flux focused by said means.

4,022,535

ACTUATOR STRUCTURE FOR BALL-POINT PENS AND OTHER WRITING INSTRUMENTS

Wilhelm Ritter, 6101 Brensbach, Odw., Germany

Filed Apr. 30, 1976, Ser. No. 682,070
Claims priority, application Germany, Apr. 30, 1975, 2519212
Int. Cl.² B43K *27/12, 24/08*
U.S. Cl. 401—32 **7 Claims**

1. In a ball-point pen or other writing instrument having an actuator mechanism by means of which a writing cartridge, movably arranged inside a body shell of said writing instrument, can be shifted longitudinally upwardly from a writing position to a retracted position, and vice versa, in said writing instrument, an exterior actuator structure comprising in combination:

an actuator member arranged longitudinally above the body shell of the writing instrument and engaging the upper extremity of the latter so as to be guided for axial movement relative thereto; and

cooperating guide portions of substantially equal outer contour on the lower extremity of the actuator member and on the upper extremity of the main shell; and wherein

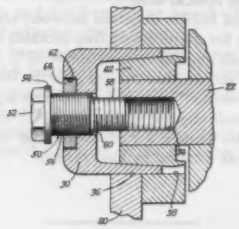
a first one of the two guide portions is tubular in cross section and has in its wall a series of axially extending parallel guide slots, which are angularly spaced on its circumference and open towards the other guide portion, thereby defining between them a first set of axially extending guide teeth; and

the second one of the two guide portions has a series of axially extending parallel recesses matching said first guide teeth for cooperation therewith in turn, defining between them a second set of axially extending guide teeth fitting into the guide slots of the first guide portion.

4,022,536
HINGE PIN CONSTRUCTION

Donald A. Piepho, Aurora, and Frederick L. Knop, Jr., East Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 5, 1976, Ser. No. 673,506
Int. Cl.² B23P 19/04
U.S. Cl. 403—16 4 Claims

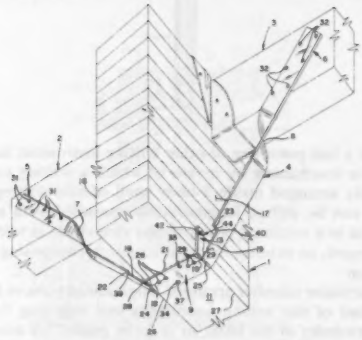


1. In a hinge pin construction including a pin adapted to journal an arm or the like, an annular wedge member associated with one end of said pin, a collet receivable on the wedge member, and a blot extending through the collet to be threadably received in a bore in the pin, the improvement wherein said bolt is also threadably received in said collet, the threads in said collet having a lesser pitch than the threads in said bore, and selectively operable spacer means disposed between said collet and the head of said bolt.

4,022,537
KNEE BRACE FOR GLULAM AND HEAVY TIMBER CONSTRUCTION

Tyrell T. Gilb, Berkeley, and Raymond E. Clarkson, Castro Valley, both of Calif., assignors to Simpson Manufacturing Co., Inc., San Leandro, Calif.

Filed July 12, 1976, Ser. No. 704,543
Int. Cl.² F16B 1/00
U.S. Cl. 403—386 3 Claims



1. A knee brace for connecting timbers or glulam beams to a transverse member or members comprising:

a. an elongated metal strap having ends adapted for connection to said transverse member;

b. said strap being formed with right angle twists so that said ends are in face to face contact with said transverse member;

c. a center portion adapted for connection to the underside surface of said glulam beam; and

d. bend tab members adapted for connection to the sides of said glulam beam and formed from said strap member adjacent to and on both sides of said center portion by cutting portions of said strap along its longitudinal side and transversely to one edge forming a pair of bendable tabs adapted for bending at a right angle about the lower edges of said glulam beam.

4,022,538
EXPANSION JOINT SEAL

Stewart C. Watson, and Thomas C. Bowman, both of Buffalo, N.Y., assignors to Watson-Bowman Associates, Inc., Buffalo, N.Y.

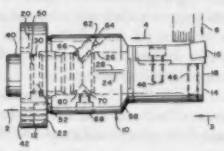
Continuation-in-part of Ser. No. 264,585, June 20, 1972, abandoned. This application Apr. 25, 1973, Ser. No. 354,360
Int. Cl.² E01C 11/12
U.S. Cl. 404—69 8 Claims

1. A prefabricated seal for a pavement joint comprising an elongated block of elastomer of substantially rectangular cross-section, means adjacent the transverse edges of said block to secure said joint to the edges of said pavement adjoining said joint, said block having at least two laterally-spaced grooves extending longitudinally therealong and vertically downward into the block from its top surface to permit expansion and contraction of the seal in accordance with the width of said joint, a metal top plate secured to the top of said block and covering the entire portion of the top surface between a pair of said grooves which are adjacent to each other, said plate being secured to the joint solely by said elastomer block, extending downwardly over the upper edge of the elastomer adjoining each of said grooves and having a pair of tongues extending downwardly and inwardly into said elastomer, to protect the edges of said elastomer and resist delamination.

4,022,539
BORING BAR STRUCTURE

Bruce G. Peuterbaugh, Mount Clemens, Mich., assignor to J. P. Tool, Inc., Warren, Mich.

Filed May 23, 1975, Ser. No. 580,157
Int. Cl.² B23B 29/034, 29/18
U.S. Cl. 408—188 4 Claims



1. Boring bar structure comprising an adapter having an axis of rotation, a bore extending through the adapter parallel to the axis of rotation, the axis of generation of which bore is offset from the axis of rotation of the adapter, spline structure within said bore adjacent one end thereof concentric with said bore, a boring bar body one end of which is slidably positioned within the bore in the adapter having an axis of rotation parallel to the axis of rotation of the adapter and on the same center line as the axis of generation of the bore, said boring bar body having concentric spline structure on the one end thereof adapted to mate with the spline structure in the bore in different relative angular positions of the adapter and boring bar body, said boring bar body having larger and smaller diameter portions forming a shoulder therebetween and being dimensioned so that with the shoulder positioned against one end of the adapter at the other end of the bore the spline structures are engaged, means for holding the shoulder on the boring bar body against the one end of the adapter in any relative angular position between the adapter and boring bar body, comprising an annular groove about the boring bar body which is within the adapter with the spline structures in mesh having a V-shaped cross section, and a set screw extending diagonally

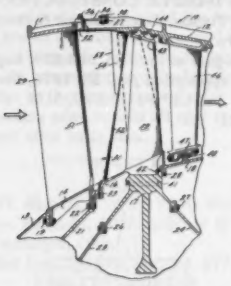
through the adapter from one side thereof into the bore and into engagement with one face of the V-shaped cross section of the groove, and separate limiting means permitting limited axial movement of the boring bar body within the adapter whereby the spline structure on the boring bar body may be disengaged from the spline structure on the adapter and complete removal of the boring bar body from the adapter is prevented, comprising a limit screw having a conical point thereon extending through the adapter into the bore therein and into the groove for engagement with a face of the groove to limit axial movement of the boring bar body in at least one direction within the adapter and a plug adjacent said spline structure in the bore closing the one end of the bore in the adapter.

4,022,540

FRANGIBLE AIRFOIL STRUCTURE

Eric A. Young, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 2, 1975, Ser. No. 618,795
Int. Cl.² F01B *25/16*
U.S. Cl. 415—9 **7 Claims**



1. An improved airfoil of the type for placement within an airstream duct in serial flow relationship with an adjacent downstream relatively rotatable airfoil and susceptible to being impacted thereby during certain airflow conditions wherein the improvement comprises:

a. a metal airfoil portion extending substantially radially within said duct; and

b. a frangible airfoil portion attached to said metal portion and adapted to break away therefrom when said adjacent airfoil impacts thereagainst.

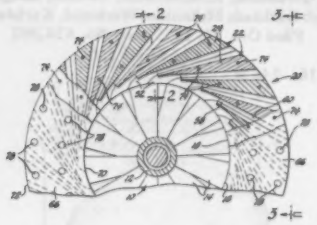
4,022,541

ASSEMBLED DIFFUSER

Wallace Perrigo, Speedway, and Esten W. Spears, Jr., Indianapolis, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 12, 1976, Ser. No. 676,153
Int. Cl.² F04D *29/54*
U.S. Cl. 415—207 **4 Claims**

1. A diffuser for use in association with a centrifugal compressor comprising first and second axially spaced side plates, each of said first and second side plates having an inner peripheral edge and an outer periphery, a plurality of diffuser vanes arranged in a circumferential array, each of said vanes including wedge configured side surfaces, located in sealing engagement with said first and second side plates, means for securing said side plates to said vanes, said diffuser vanes each having an upper and a lower surface thereon diverging from each other from the inner to outer peripheries of said side plates, each of said vanes having a pair of upper side flanges, thereon integral with said side surfaces and extending longitudinally of said upper surface throughout its length, each of said vanes further including a pair of lower side flanges integral with said side surfaces and extending longitudinally of said lower surface, said upper and lower side flanges on adjacent vanes being juxtaposed to define a diffuser passage between adjacent one of said vanes having a closed perimeter defined by the upper and lower surface on adjacent vanes and juxtaposed upper and lower side flanges on each of the adjacent vanes and engaging each other and including an inlet and



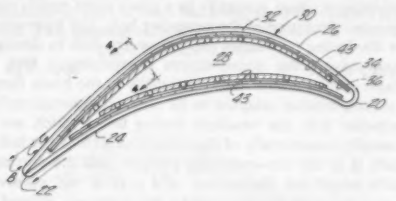
outlet, said paris of flanges each having a variable thickness to vary the cross sectional area of said passage from the inlet to the outlet of said passage, and means for securing said individual plates to said side walls to locate each of said separate vanes in a continuous circumferentail array around the full circumference of said side plates.

4,022,542

TURBINE BLADE

Dennis E. Barbeau, Temperance, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Oct. 23, 1974, Ser. No. 517,143
Int. Cl.² F01D *5/18*
U.S. Cl. 416—97 A **17 Claims**



1. In a transpiration cooled turbine blade having a base, a tip, a concave surface, a convex surface, a leading edge, a trailing edge, a hollow interior adapted to receive coolant fluid therein, and a porous wall adapted to conduct said fluid from said interior to the surfaces of said blade, the improvement which comprises:

a. a porous outer layer in said wall defining the outer surface of said blade and extending from said leading edge to said trailing edge;

b. a second layer in said wall positioned inwardly of said outer layer, said second layer being provided with a plurality of holes;

c. a third layer in said wall positioned inwardly of said second layer, said third layer being provided with a plurality of holes which meter the distribution of fluid over the area of said second layer and over the area of said outer layer which is coextensive with said second layer;

d. said holes in said third layer registering respectively with said holes in said second layer;

e. said outer layer, said second layer and said third layer forming said hollow interior to be unobstructed, continuous and to conform substantially to the shape of the outer surface of said blade; and

f. the area of said outer layer by said second and third layers terminates short of the areas near said edges in a manner

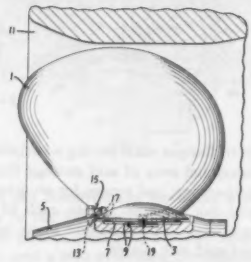
to permit substantially direct contact of said fluid in said interior with said outer layer at said edges.

4,022,543

APPARATUS FOR FACILITATING REMOVAL OF A MARINE PROPELLER BLADE

Stig Kåre Göransson, Kristinehamn, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden

Filed Oct. 21, 1975, Ser. No. 624,392
Int. Cl.² B63H *5/14*
U.S. Cl. 416—146 R **4 Claims**



1. In a marine propeller of the type that is surrounded by an annular nozzle and having a propeller hub with recesses circumferentially spaced thereabout and defining propeller blade sites, propeller blades having blade flanges removably and rotatably mounted in the recesses, the blade flanges and hub recesses having interfitting guide edges for properly locating the blades on the hub, the blades being rotatable from an operating position generally in a plane more nearly perpendicular to the axis of rotation of the propeller hub to a non-operating position generally in a plane more nearly parallel to the axis of rotation of the propeller hub, and hydraulic means for displacing the blades away from the hub to disengage the guide edges, the improvement comprising a first bracket adapted to be connected temporarily to the blade flanges and a second bracket adapted to be connected temporarily to the propeller hub, the brackets having holes which are aligned generally transversely of the rotational axis of the hub when a blade is in the non-operating position and the corresponding guide edges are disengaged, and a pivot pin removably received through the holes when the holes are aligned, so that the blade is pivotable about the pivot pin and out of the surrounding nozzle generally in the axial direction.

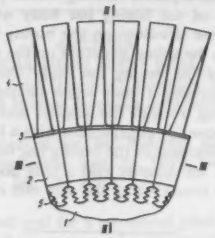
4,022,544

TURBOMACHINE ROTOR WHEEL

Anatoly Viktorovich Garkusha, ulitsa 23 avgusta 63, kv. 82; Yakov Isidorovich Shnee, prospekt Pravdy, 7, kv. 89; Anna Grigorievna Ponkratova, ulitsa Malaya Dzhankoiskaya, 8, kv. 20; Viktor Pavlovich Sukhinin, Moskovsky prospekt, 216/3, kv. 35; Boris Abramovich Arkadiev, ulitsa Severnaya 22, kv. 42, and Ljudmila Dmitrievna Moskvina, ulitsa Kharkovskikh Divizy, II/9, kv. 68, all of Kharkov, U.S.S.R.

Filed Jan. 10, 1975, Ser. No. 540,271
Int. Cl.² F01D *5/22*
U.S. Cl. 416—193 R **9 Claims**

1. A turbomachine rotor wheel comprising: a disk; a plurality of radially inner row blades installed on said disk; adjacent inner row blades defining blade passages intended to admit the working medium; said blades including, in a section through said inner row blades normal to the axis of said blades, at least two parts, spaced a distance equal to the width of said blade passage; one of said parts being an inlet portion in one section and the other part an outlet portion in an adjacent section; radially outer row blades; blade dividing platforms secured to said outer and inner row blades to prevent interaction between the working medium flow streaming over said outer row blades and the working medium flow streaming over said inner row blades, each dividing platform being attached to at least



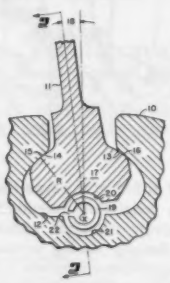
two said parts of the section of the inner row blade and being used to attach a corresponding said outer row blade.

4,022,545

ROOTED AERODYNAMIC BLADE AND ELASTIC ROLL PIN DAMPER CONSTRUCTION

Wayne C. Shank, Tucson, Ariz., assignor to Avco Corporation, Williamsport, Pa.

Continuation-in-part of Ser. No. 504,889, Sept. 11, 1974, abandoned. This application Jan. 28, 1976, Ser. No. 653,145
Int. Cl.² F01D *5/10, 5/32*
U.S. Cl. 416—221 **2 Claims**



1. In rotating machinery, the combination of:
an aerodynamic blade having a root formed with outwardly curved shoulders and an axially extending lower curved indentation,
a rotor disc formed with a transverse blade root receiving slot having curved retaining surfaces in contact with said shoulders, and
an elastic split metallic roll pin disposed between said indentaion and disc to provide damping while permitting the blade to tilt, the axis of swinging movement of the blade being below its root and the curved shoulders and complementary retaining surfaces being generated by a radius having such axis as a center, the roll pin assuring contact at low speeds between said shoulders and said surfaces.

4,022,546

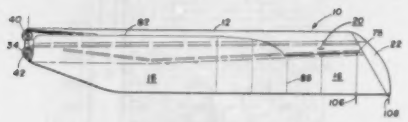
HELICOPTER ROTOR BLADE

Jan M. Drees, Dallas; Arthur D. Gravley, Euless; Charles V. Palachek, Smithfield, and James L. Spencer, Arlington, all of Tex., assignors to Textron, Inc., Providence, R.I.

Continuation of Ser. No. 430,344, Jan. 3, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,577
Int. Cl.² B64C *27/46*
U.S. Cl. 416—226 **20 Claims**

1. An airfoil, which comprises in combination:

a nose spar extending lengthwise of the airfoil at the leading edge thereof and having upper and lower trailing edges,
an aft spar located on a lengthwise axis of the airfoil positioned from said nose spar,
an upper after body skin secured at the leading edge to the upper trailing edge of said nose spar from the airfoil root to a transition point and thereafter to said aft spar,
a lower after body skin secured at a leading edge to said aft spar and coupled at a trailing edge thereof to the trailing edge of the upper after body skin,
a lower forward body skin secured at a leading edge to the



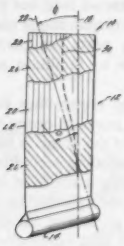
lower trailing edge of said nose spar and at a trailing edge to said aft spar at the leading edge of said after body skin, and
between the upper after body skin and the lower forward body skin from the airfoil root to the transition point, an upper forward body skin secured at a leading edge to said nose spar and at a trailing edge to said aft spar to form a torque box therewith, from the transition point to the airfoil tip the upper forward body skin is secured at a leading edge to the upper trailing edge of said nose spar and at a trailing edge to said aft spar at the leading edge of the upper after body skin.

4,022,547

COMPOSITE BLADE EMPLOYING BIASED LAYUP

Max W. Stanley, Fairfield, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 2, 1975, Ser. No. 618,797
Int. Cl.² F01D *5/14*
U.S. Cl. 416—230 **13 Claims**



1. A blade for use in a fluid flow machine comprising a plurality of filament laminates bonded together to form the blade, said filament laminates having an axis of symmetry which is skewed from the blade longitudinal axis.

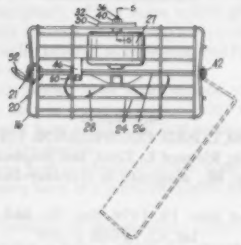
4,022,548

AIR CIRCULATING FAN AND MOTOR WITH SEPARABLE SAFETY GUARD

Gordon McLarty, 209 W. Jefferson St., Augusta, Mich. 49012

Filed Apr. 2, 1976, Ser. No. 672,987
Int. Cl.² F04D *29/32*
U.S. Cl. 416—247 R **2 Claims**

1. A portable electric fan having a motor and a fan blade mounted within an enclosure, said enclosure comprising
two identical box-like halves with short side walls on each edge of a square center wall,
said halves being made from cruciform blanks of wire grid material having closely spaced parallel wires connected by more widely spaced crossing wires with marginal wires along the outer edges of the arms of the blanks,
the arms of the blanks being bent inwardly in opposed relation to the ends of each other, with the ends of at least two opposed arms being bent at least 105° from the planes of the centers of the walls to which they are connected,



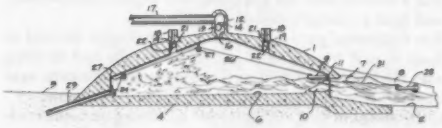
hinge means connecting the marginal wires on the ends of said last two of said arms and recessed into said enclosure when the halves are closed,
releasable latch means connecting the opposed ends of other opposed arms of said blanks in spaced relation to said hinge means,
and a mounting plate welded to the center of one of said halves and receiving mounting connections from said motor.

4,022,549

SHORELINE AIR COMPRESSORS WHEREIN SWELL WATER PUMPS THE AIR

Harold Gregg, Petaluma, Calif.

Continuation-in-part of Ser. No. 600,317, July 30, 1975, abandoned. This application Apr. 30, 1976, Ser. No. 681,921
Int. Cl.² F04F *11/00*
U.S. Cl. 417—100 **8 Claims**



1. A swell water utilizing structure comprising
a dome on the sea bottom near the shore
an inlet to the interior of said dome facing away from the shore,
a pair of guide walls extended toward the open water and diverging away from said inlet to guide the swells toward said inlet,
and covering means for said inlet being openable by the swell water toward the shore for compressing air in the dome and being closed by the receding of the swell water away from the shore,
one way outlet means for discharging the swell water from said dome,
means to co-ordinate the opening of said inlet covering means and of said outlet means so that the closing of said inlet covering means opens said outlet means,
outwardly one-way conducting means on the dome for conducting the air compressed by the swell water in said dome away from said dome, said one-way conducting means being closed by the suction created by the receding of the swell water from said dome,
and a plurality of inwardly one-way check devices openable

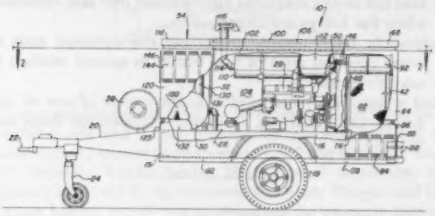
by the swell waters receding from said structure to admit atmospheric air, said check devices being adapted to be closed by the compression of the air when the swell water enters into said dome.

4,022,550

ENCLOSED COMPRESSOR UNIT

Robert A. Brink; Richard L. Ertel, and Stephen A. Thompson, all of Quincy, Ill., assignors to Gardner-Denver Company, Dallas, Tex.

Filed Mar. 19, 1976, Ser. No. 668,550
Int. Cl.² F04B *21/00*
U.S. Cl. 417—234 **11 Claims**



1. A compressor unit comprising a frame, an engine mounted on said frame and drivingly connected to a gas compressor support on said frame, air cooled heat exchanger means disposed on said frame, an enclosure for said compressor unit for attenuating sound generated by said compressor unit, said enclosure being characterized by:

a roof, longitudinal side walls, transverse outer end walls, and a bottom plate for enclosing said engine, compressor, and heat exchanger means;

a first transverse partition within said enclosure defined at least in part by said heat exchanger means and dividing said enclosure into first and second compartments, said engine being disposed in said second compartment;

inlet openings in said enclosure for admitting ambient cooling air into said first compartment;

a second transverse partition extending downward from said roof and terminating above said bottom plate and spaced from said heat exchanger means to delimit said second compartment;

duct means formed in part by said second partition and said walls of said enclosure, said duct means being in communication with said second compartment by way of an opening formed between said bottom plate and said second partition;

two spaced apart longitudinal partitions extending from said second partition to one outer end wall of said enclosure and dividing said duct means into first and second side ducts and a center duct disposed between said side ducts; and,

outlet openings in said enclosure for conducting cooling air from said duct means to the exterior of said enclosure; and,

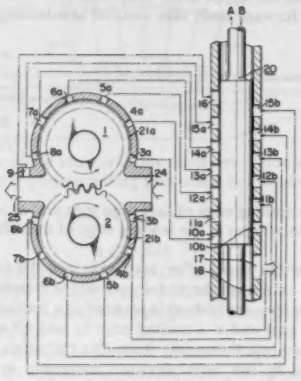
a fan disposed in said enclosure for causing cooling air to flow through said inlet openings into said first compartment and then through said heat exchanger means, then through said second compartment, then through said duct means, and then through said outlet openings to the exterior of said enclosure.

4,022,551

VARIABLE CAPACITY TYPE GEAR PUMP

Shingo Hirosawa, Yokohama, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 368,091, June 8, 1973, abandoned.
This application Nov. 6, 1975, Ser. No. 629,250
Claims priority, application Japan, June 13, 1972, 47-58181
Int. Cl.² F04B *49/00;* **F04C** *1/08*
U.S. Cl. 417—440 **1 Claim**



1. A variable capacity gear pump having a low pressure suction side and a high pressure feed out side comprising:

a pair of circumferentially intermeshing gears operatively connected in the pump;

a pair of pump casings around the gears having walls which generally correspond to the surfaces of the addendum circles of the gears and include an inlet port at the suction side and an output port at the feed out side; both of the pump casings further including at least five pressure relief ports substantially equally spaced around the periphery of each of the pump casings from the low pressure suction side to the high pressure feed out side, each port on each casing having a correspondingly placed port on the other casing so that the ports are paired, the ports passing through said walls to facilitate selective fluid by-pass therethrough;

means for selectively controlling liquid flow operatively coupled with said ports in order to vary the amount of liquid feeding out of the pump at high pressure, the means for selectively controlling including a control valve having a cylinder having a series of inlet ports, a discharge port and a rod in the cylinder to control the fluid paths between the inlet ports and the discharge port; each of said inlet ports on said control valve being operatively connected to at least one of the pressure relief ports, the inlet ports being operatively connected to sequentially open at least one of the pressure relief ports of each pair and then the other pressure relief port of the same pair starting from the pair on low pressure suction side and ending with the pair on the high pressure feed out side and closing in the reverse order so that the low pressure fluid can be initially discharged from the pump when a lower volume feed out is desired without the necessity of raising the discharged fluid to a high pressure.

4,022,552

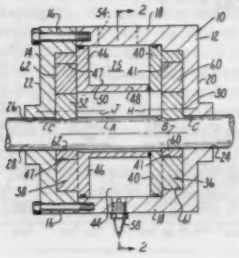
VANE TYPE FLUID POWER MACHINE

Donald G. Wilson, 4154 Stathmore Lane, San Antonio, Tex. 78217

Filed Mar. 17, 1976, Ser. No. 667,766
Int. Cl.² F01C *1/00;* **F04C** *17/00;* **F02B** *55/14*
U.S. Cl. 418—37 **11 Claims**

1. A vane type fluid power machine comprising means

defining a circular working chamber; first and second vane units independently movable within the working chamber for rotary motion around the chamber axis, the vanes in the respective units being interspersed so tha adjacent vanes form variable volume pressure compartments; a rotary power output crank shaft centered on a second axis parallel to, but



eccentric from, the chamber axis; and a separate drive connection between the crank shaft and each vane unit, whereby each vane has a cyclically varying rotational velocity; each drive connection comprising a circular crank pin carried by the crank shaft, and a circular rotor floatably positioned between the respective crank pin and respective vane unit.

4,022,553

ROTARY PISTON COMPRESSOR WITH INLET AND DISCHARGE THROUGH THE PISTONS WHICH ROTATE IN THE SAME DIRECTION

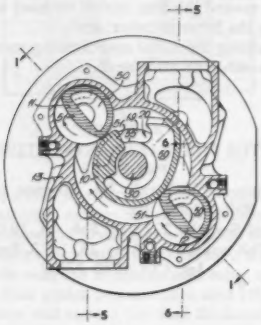
Eric John Poole, Wendover, and Sidney John Morris, High Wycombe, both of England, assignors to Compair Industrial Limited, England

Filed June 24, 1975, Ser. No. 589,924

Claims priority, application United Kingdom, July 2, 1974, 29271/74

Int. Cl.² F01C *1/24*; F04C *17/16*

U.S. Cl. 418—183 **9 Claims**



1. A rotary piston compressor comprising:

a housing;

a cylindrical main rotor bore formed in the housing; at least one auxiliary rotor bore formed in the housing parallel to and intersecting the main rotor bore, and extending beyond at least one end of the main rotor bore; end walls closing both axial ends of the main rotor bore; an inlet to the main rotor bore;

a main rotary piston rotatably mounted in the main rotor bore and making sealing engagement with the end walls of the main rotor bore, said main rotary piston having a generally cylindrical portion of lesser diameter than that of the main rotor bore and a summit portion which extends from the cylindrical portion to engage the wall of the main rotor bore;

an auxiliary rotary piston rotatably mounted in the, or each, auxiliary rotor bore and projecting axially beyond at least one end of the main rotor bore;

said auxiliary rotary piston having a first portion with a profile which is complementary to that of the main rotary piston such that when the auxiliary and main pistons are driven at the same speed in the same direction of rotation the first portion makes continuous sealing engagement with the periphery of the main rotary piston along the entire length thereof, and having a second portion which projects axially beyond at least one end face of the main rotary piston;

a transfer port formed in at least one end wall of the main rotor bore and in communication with the part of the auxiliary rotor bore containing said second portion of the auxiliary rotary piston;

and a discharge port in communication with said port of the auxiliary rotor bore at a position spaced from the transfer port;

said second portion of the auxiliary rotary piston having means forming a rotary valve for opening and closing communication between the transfer port and the discharge port at the required times during the rotational cycle of the machine.

4,022,554

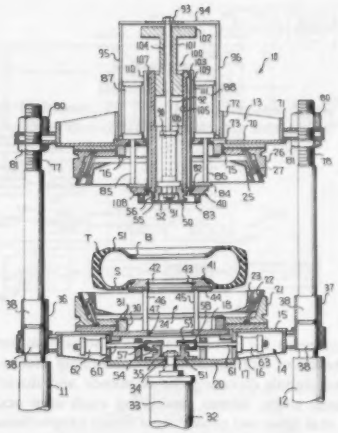
RETREAD MOLDS

Kenneth T. MacMillan, Macon, Ga., assignor to MacMillan Mold Company, Macon, Ga.

Continuation of Ser. No. 568,738, April 16, 1975, abandoned, which is a continuation of Ser. No. 514,486, Oct. 15, 1974, abandoned, which is a continuation of Ser. No. 287,826, Sept. 11, 1972, abandoned. This application Dec. 23, 1975, Ser. No. 643,648

Int. Cl.² B29H *5/04*

U.S. Cl. 425—23 **2 Claims**



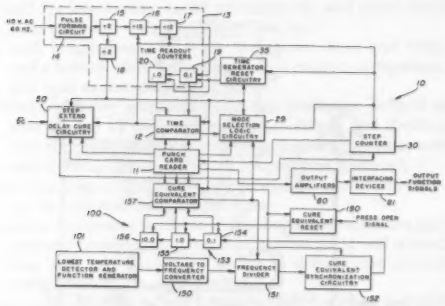
1. A retread mold comprising first and second relatively movable supports, cooperative matrix portions carried by said supports, means for imparting relative movement to said supports to move said matrix portions between open and closed positions in the latter of which said matrix portions define an annular cavity adapted to receive a tire to be retreaded, means for selectively adjusting the distance between said movable supports with respect to the closed position of said matrix portions to accommodate tires of different widths in said cavity, means for locking said movable supports relative to each other in the closed position of said matrix portions at all

distances between said movable supports when said matrix portions are in the closed position thereof, said locking means having cooperable locking portions carried by both said movable supports, means for adjustably varying the length of at least one of said locking portions to securely lock said movable supports together with said matrix portions in the closed position irrespective of the distance between said movable supports in said last-mentioned position, a pair of vertical supports, means mounting said first relatively movable support for vertical reciprocal sliding motion upon said pair of vertical supports, said length adjusting locking means including an internally threaded mounted for vertical sliding movement relative to said first support, said tube having upper and lower end portions, said lower tube end portion carries one of said cooperable locking portions a screw threaded to said internally threaded tube, a fluid cylinder and piston rod both disposed at least partially within said tube, means connecting one of said cylinder and rod to said tube means connecting another of said cylinder and rod to said first support, and stop means for limiting the travel of said tube in a direction toward said locking portion of a second of said supports.

4,022,555
TIRE CURE PROGRAMMER AND FUNCTION GENERATOR

Thomas W. Smith, Akron, Ohio, assignor to McNeil Corporation, Akron, Ohio

Filed Apr. 26, 1971, Ser. No. 137,427
Int. Cl.[2] B29H *5/02*
U.S. Cl. 425—29 **20 Claims**

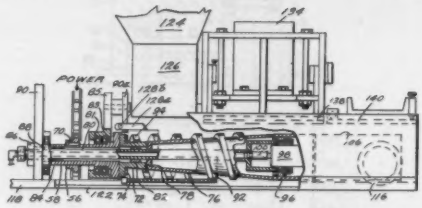


1. Apparatus for controlling the operational steps in the vulcanization of a pneumatic tire comprising means providing command signals dictating the sequence and duration of the operational steps, means measuring each step according to elapsed real time and providing a signal proportional thereto, first comparison means comparing a signal from said means providing command signals with the signal proportional to elapsed real time and supplying an output signal upon a match thereof, means measuring the steps according to elapsed cure equivalents and providing a signal proportional thereto, second comparison means comparing a signal from said means providing command signals with the signal proportional to elapsed cure equivalents and supplying an output signal upon a match thereof, and means selectively receiving the output signals of said first and second comparison means and controlling the operational steps of the vulcanization of the pneumatic tire.

4,022,556
CONCRETE SLAB EXTRUDER HAVING A FREE FLIGHT AUGER

Ted G. Goetjen, Silver Spring, Md., assignor to The George Hyman Construction Company, Bethesda, Md.

Filed Apr. 30, 1975, Ser. No. 573,327
Int. Cl.[2] B28B *13/02*
U.S. Cl. 425—64 **8 Claims**

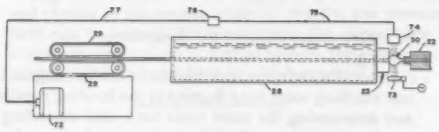


1. A machine for forming hollow cored articles, comprising:
a frame;
at least one rotatable auger of open spiral configuration having an internal surface conforming to an envelope produced by a surface of revolution;
means supporting the at least one auger for rotation about its central longitudinal axis in a stationary position relative to the frame;
a power source mounted on the frame for rotating the at least one auger;
an initial non-rotatable core forming member associated with the at least one auger and having a predetermined cross section with an outer surface conforming substantially to the internal surface of the rotatable auger and having a major portion encompassed thereby;
a final core forming trowel member secured in axial alignment to the initial core forming member and establishing the final cross sectional configuration of the core;
means surrounding at least the final trowel member to establish the outer surfaces of the article being formed;
feed chamber means surrounding said rotatable auger for confining said material whereby the auger moves the material toward the final trowel member and means surrounding the latter member; and
means mounting the initial core forming member and final trowel member on the frame.

4,022,557
APPARATUS FOR MAKING STRUCTURAL FOAM PROFILES

Keith G. Johnson, Pittsburgh, Pa., assignor to ARCO Polymers, Inc., Philadelphia, Pa.

Division of Ser. No. 227,575, Feb. 18, 1972, Pat. No. 3,922,328. This application May 25, 1973, Ser. No. 363,794
Int. Cl.[2] B29D *27/00*
U.S. Cl. 425—71 **6 Claims**



1. Apparatus for making continuous lengths of a resin profile of predetermined cross sectional area from softened thermoplastic resin material containing a foaming or expanding agent, comprising extrusion means for pressurizing a stream of heat softened resin material, the extrusion means having a delivery orifice, a cooled shaping die having entrance and discharge ports and having a flow passage of the sectional

shape of the profile and of the same cross sectional area as said predetermined cross sectional area of the profile, the delivery orifice of the extrusion means and the entrance port of the shaping die being spaced from each other to provide an intervening unconfined zone in which the extruded resin material may expand to form a mass of partially expanded resin material, and puller mechanism engaging the profile downstream of the shaping die, the extrusion means and the puller mechanism operating respectively to deliver resin material into and to withdraw resin material from said unconfined zone at rates maintaining in said zone a mass of partially expanded resin material having a cross section larger than that of the die passage the puller mechanism including control means responsive to the size of the mass of partially expanded resin material to vary the speed of operation of the puller mechanism to maintain the cross section of said mass substantially uniformly at a predetermined size appreciably larger than the cross section of the die passage.

4,022,558

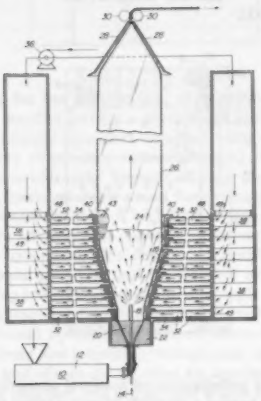
APPARATUS FOR THE EXTRUSION OF TUBULAR THERMO-PLASTIC FILM

F. John Herrington, Holcomb, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 467,187, May 6, 1974, Pat. No. 3,976,732. This application Dec. 15, 1975, Ser. No. 641,063

Int. Cl.² B29D *23/04*

U.S. Cl. 425—72 R **2 Claims**



1. In an apparatus for forming tubular thermoplastic film comprising extruder means; annular extrusion die means, adapted in combination to extrude a seamless tube of thermoplastic film; pinch rollers spaced downstream from said annular extrusion die acapted to flatten said tube; and means for introducing a fluid under pressure into said tube to biaxially expand said tube and reduce the wall thickness thereof; the improvement which comprises a configuration imposition assembly disposed concentric to said extruded tube downstream of and adjacent to said annular die, which assembly comprises a series of spaced pairs of diverging aperture row means directed toward said extruded tubing, means for forcing a fluid through said apertures toward said extruded tubing thereby creating a suction and thus drawing said extruded tubing toward said assembly, said configuration imposition assembly further comprising a plurality of vertically spaced-apart individual plenum chambers, said aperture row means being further characterized by being detachably connected to said individual plenum chambers, and a common chamber formed by superposed individual plenum chambers for feeding said fluid under pressure into said individual plenum chambers.

4,022,559

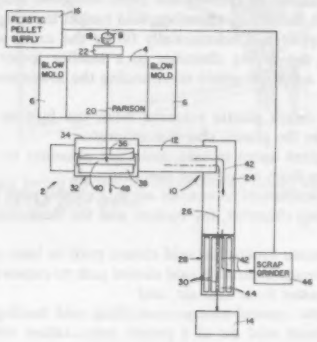
PARISON SLICER FOR PLASTIC MOLDING MACHINES

William W. Nielson, Berkeley, Calif., assignor to Flexible Plastics Corporation, Petuluma, Calif.

Filed Oct. 6, 1975, Ser. No. 619,998

Int. Cl.² B29D *23/04*

U.S. Cl. 425—184 **21 Claims**



1. Apparatus for molding a heat softened plastic into an object comprising: plastic extrusion means continuously extruding a heated plastic ribbon; a mold receiving short ribbon sections from said extrusion means and molding the sections into molded objects; conveying means disposed beneath the mold for transporting the objects away from the mold; and nibbler means attached to the apparatus and movable into and out of registration with the extruded ribbon engage the ribbon issuing from the extrusion during mold downtimes and sever the ribbon into small pieces for the subsequent re-use of the pieces, the nibbler means being positioned between the extrusion means and the transport means when the nibbler means is in registration with the ribbon, the nibbler means further including means discharging the pieces onto the conveying means.

4,022,560

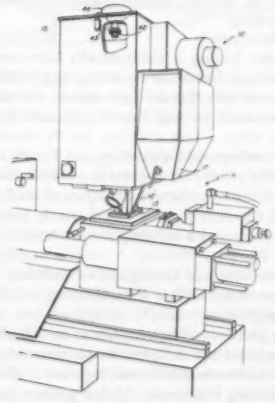
DRYING DEVICE

Russell M. Heinonen, 25 Temi Road, Hudson, Mass. 01749

Filed Dec. 29, 1975, Ser. No. 644,597

Int. Cl.² B29B *3/04;* **F26B** *21/04*

U.S. Cl. 425—317 **2 Claims**



1. A dryer for plastic material to be mounted on plastic shaping apparatus such an an extruder, mold or the like, comprising a self contained assembly having:

a drying chamber of rectangular cross sectional shape positioned against the plastic shaping apparatus,

a desiccant chamber of rectangular cross sectional shape positioned beside the drying chamber having within said rectangular shape parallel and confronting screens located above and below a desiccant agent through which air is caused to flow,

a porous basket of rectangular cross sectional shape positioned in the drying chamber, said basket tapering from a larger upper end substantially filling the cross sectional area of the drying chamber to a smaller lower end to provide a free air space surrounding the lower end of the basket,

means to direct plastic material from the bottom of said basket to the plastic shaping apparatus,

said desiccant agent in said desiccant chamber to remove moisture from air passing therethrough,

a blower positioned to convey air in a closed path through the drying chamber, the basket, and the desiccant chamber,

heating means located in said closed path to heat said air,

air filter means located in said closed path to remove particulate matter from said air, and

thermostatic control means controlling said heating means to maintain said air at a preset temperature when said dryer is operating.

4,022,561

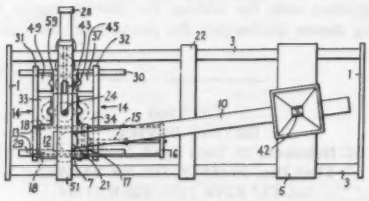
MACHINE FOR MANUFACTURING PLASTICS BOTTLES AND OTHER HOLLOW ARTICLES

Bernard Strong, 22228 Victory Blvd. Apt. H 211, Woodland Hills, Calif. 91364

Filed June 7, 1976, Ser. No. 694,068

Int. Cl.² B29C *17/07*

U.S. Cl. 425—326 B **10 Claims**



1. Machine for making blown hollow articles of plastics material comprising

a. a frame structure,

b. an extruder having a substantially horizontal extruder barrel having a downwardly extending extrusion nozzle adjacent one end thereof and means for the supply of plastics material to said barrel adjacent the other end thereof,

c. means mounting and supporting said barrel on said frame structure for pivotal movement in a substantially horizontal plane about a vertical axis adjacent said other end of the barrel for movement of said nozzle between an extruding station and a molding station horizontally spaced from one another,

d. said extrusion nozzle having a core defining therewith an annular extrusion orifice for extruding a tubular parison therethrough,

e. opposing and spaced-apart platens to which halves of a split blow mold are adapted to be secured respectively, said mold-halves when closed together defining a cavity at said molding station in which a parison is to be blown to form a hollow article,

f. means for moving said platens to close together or move apart mold halves supported thereby,

g. means defining a passage in said core of the extrusion nozzle for admitting compressed air therethrough to a parison depending from the nozzle,

h. cutting means for severing a parison, when the nozzle is in said molding station, from the plastics material within said nozzle,

i. a downwardly directed blow pin mounted from the frame structure on a guide member movable horizontally to move the blow pin between said molding station and a discharging station horizontally spaced from said molding station in the direction away from said extruding station,

j. means coupling said guide member and said extruder barrel for simultaneous movement of the extrusion nozzle between the extruding and molding stations and the blowing nozzle between the molding and discharging stations respectively,

k. means for moving said guide member to move said blowing nozzle back and forth between said molding and discharging stations, and

l. means for moving said blow pin vertically relative to said guide member between a lowered position and a raised position.

4,022,562

PRESS HAVING TORQUE RESPONSIVE DRIVE

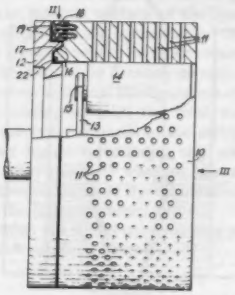
Robert Spencer, Stroud, England, assignor to Simon-Barron Limited, Gloucester, England

Filed Oct. 2, 1975, Ser. No. 619,008

Claims priority, application United Kingdom, Nov. 9, 1974, 48587/74

Int. Cl.² B28B *21/24*

U.S. Cl. 425—331 **12 Claims**



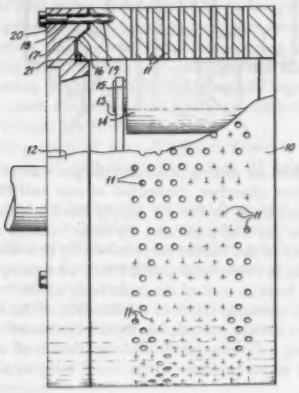
1. A press for pelletization of material comprising an annular die member having a plurality of radial bores therethrough, a stationary support disposed within said die, a plurality of pressure rollers arranged in a row around the inner circumferential surface of said die member, said rollers being freely rotatable about fixed parallel axes and with the radially outer surface of each roller closely adjacent the inner surface of said die member, a driving rim member mounted for rotation about a central axis parallel to said roller axes, and means mounting said die member on said rim member comprising interfitting coextensive complementary axially oppositely facing frusto-conical male and female surfaces and coacting means on said rim member and the adjacent end of said die member for attaching said die and rim member together and urging said frusto-conical surfaces into pressurized engagement comprising wedge and ramp means on said members distinct from said frusto-conical surfaces and engaging in one or more inclined planes disposed at an angle to said central axis whereby transmission to torgue from said rim member to said die member acts through said wedge and ramp means to relatively axially urge said frusto-conical surfaces into increased pressurized engagement, rotation of said rim member rotating said die member about said central axis so that material fed into the interior of the die member is forced out

through the die member bores by action of said pressure rollers.

4,022,563
PRESSES

Robert Spencer, Stroud, England, assignor to Simon-Barron Limited, Gloucester, England

Filed Oct. 2, 1975, Ser. No. 619,010
Claims priority, application United Kingdom, Nov. 9, 1974, 48585/74
Int. Cl.² B28B *21/24*
U.S. Cl. 425—331 **9 Claims**



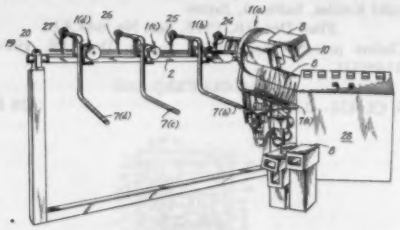
1. A press for the pelletization of material comprising an annular die member having a plurality of radial bores therethrough, a stationary support disposed within said die member, a plurality of pressure rollers arranged in a row around the inner circumferential surface of said die member, said rollers being freely rotatable about fixed parallel axes and with the radially outer surface of each roller closely adjacent the inner surface of said die member, a driving rim member mounted for rotation about a central axis parallel to said roller axes, and means mounting said die member on said rim member comprising interfitting coextensive complementary axially oppositely facing male and female frusto-conical surfaces on said members and a plurality of fastener elements peripherally distributed about and extending through said rim member into the adjacent end of said die member for attaching said die and rim members together and urging said frusto-conical surfaces relatively axially into pressurized engagement, rotation of said rim member thereby rotating said die member about said central axis so that material fed into the interior of the die member is forced out through the die member bores by action of said pressure rollers.

4,022,564
MOLDING APPARATUS UTILIZING PLANETARY GEAR ARRANGEMENT

John Dawson, Edgworth, England, assignor to Rototron Corporation, Farmingdale, N.Y.

Filed Mar. 14, 1975, Ser. No. 558,243
Int. Cl.² B29C *5/04*
U.S. Cl. 425—430 **10 Claims**

1. Molding apparatus comprising a support, means coupled to said support to pivot the support between two angular limits, a gear wheel mounted on said support to be pivoted therewith, planetary gears mounted on said support and engaged with said gear wheel, means mounted on said support to displace said planetary gears around said gear wheel so that the planetary gears are rotated by the latter said gear wheel, molds coupled to said planetary gears to be rotated therewith, and heating means below the molds to heat the molds as the

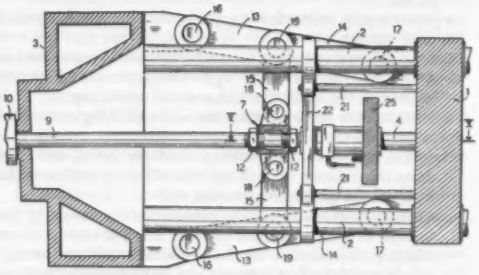


molds are being rotated simultaneously about their axes and the axis of the gear wheel.

4,022,565
MOLD CLAMPING APPARATUS FOR MOLDING MACHINERY

Giovanni Bodini, Varese, Italy, assignor to Ingersoll-Rand Negri-Bossi S.p.A., Milan, Italy

Filed Sept. 29, 1975, Ser. No. 617,319
Claims priority, application Italy, Oct. 8, 1974, 70001/74
Int. Cl.² B29F *1/00*
U.S. Cl. 425—444 **8 Claims**



1. Mold clamping apparatus for molding machinery, comprising a plurality of platens, a plurality of tie rods supporting one of said platens for movement relative to another thereof between a mold closed position and a mold open position, movable crosshead means, toggle linkage means connecting said crosshead means with said one of said platens for causing movement of said crosshead means to move said one of said platens relative to said another thereof, drive means connected to said crosshead means for causing driven movement of said crosshead means, a plurality of guide rods directly connected to said one of said platens for movement therewith, operatively associated with said crosshead means, and extending forwardly and rearwardly of said crosshead means, relative to said crosshead means movement, for guiding said crosshead means during its driven movement to prevent lateral displacement of said crosshead means during its said movement; and guide rod supporting means connected to said tie rods to permit movement of the rod supporting means with said movable platen, and means connecting said movable platen with said guide rod supporting means for conjoined movement by said toggle linkage means.

4,022,566

GAS-FUELED ELECTRIC LIGHTER

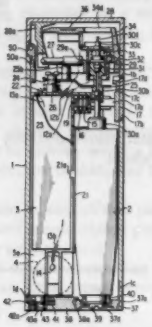
Kenjiro Goto, Urawa, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Saitama, Japan

Filed Dec. 18, 1975, Ser. No. 641,814

Claims priority, application Japan, Dec. 19, 1974, 49-154140[U]

Int. Cl.² F23Q 2/08

U.S. Cl. 431—132 **25 Claims**



1. A gas-fueled electric lighter comprising
a casing,
a fuel reservoir arranged within the casing,
a burner valve with a fuel discharge nozzle mounted on the fuel reservoir to permit a gaseous fuel to issue therefrom,
a valve control means adapted to open and close the burner valve,
a spark gap arranged adjacent to the fuel discharge nozzle,
a high voltage generating circuit for generating a sparking energy sufficient to ignite the fuel from the fuel discharge nozzle,
a power supply source for energizing the high voltage generating circuit,
first and second switching contacts electrically connected to a pair of terminals of the high voltage generating circuit to control the spark discharge at the spark gap,
a first actuator for operating the first switching contact in relation to the second switching contact,
the first and second switching contacts being arranged moveable relative to each other to effect operation of the high voltage generating circuit, and
a second actuator arranged to control the movement of the second switching contact between its operative position where it can contact the first switching contact through operation of the first actuator and its inoperative position where it is maintained not to contact the first switching contact.

4,022,567

BURNER FOR BURNING LIQUID FUEL IN GASIFIED FORM

Kingo Miyahara, Tokyo, Japan, assignor to Dowa Co., Ltd, Tokyo, Japan

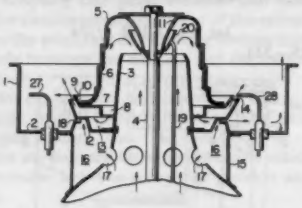
Filed Dec. 17, 1975, Ser. No. 641,761

Claims priority, application Japan, Jan. 15, 1975, 50-7353[U]; Apr. 21, 1975, 50-54291[U]; Apr. 21, 1975, 50-54292[U]; Apr. 25, 1975, 50-56639[U]; Apr. 25, 1975, 50-56640[U]; Apr. 21, 1975, 50-48326

Int. Cl.² F23D 11/04

U.S. Cl. 431—168 **7 Claims**

1. A burner for burning liquid fuel in gasified form comprising:
an air supply duct inserted into a main body of the burner and opening therein;
a fuel cone shaped gasifying member rotatably disposed in the main body of the burner and mounted in opposite relation to said air supply duct;
a gasified fuel-air mixing plate having a fuel scattering surface and a gasified fuel air mixture passage, and mounted to the open end portion of said fuel gasifying member to define a liquid fuel scattering gap therebetween;
a gas wall plate interposed between the gasified fuel-air mixing plate and inner bottom wall of the main body;
a gas chamber having a gasified fuel blowing passageway inclined obliquely outwardly and mounted between the



gasified fuel-air mixing plate and the gas wall plate and an air ejection chamber connected at one end through air supply openings to the air supply duct is provided between the gas wall plate and the inner bottom wall of the main body of the burner respectively by providing the gas wall plate between said gasified fuel-air mixing plate and an inner bottom wall of the main body of the burner; and
air ejection openings open to the interior of the main body of the burner are provided in the air ejection chamber for producing a flowing air film of the stream of an air blast supplied under pressure in the main body of the burner.

4,022,568

METHOD AND APPARATUS FOR HEAT TREATING PULVEROUS RAW MATERIALS

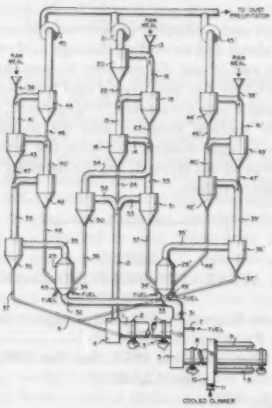
Halvor Meedom, Copenhagen Valby, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Aug. 11, 1975, Ser. No. 603,867

Claims priority, application Denmark, Aug. 12, 1974, 4272/74

Int. Cl.² F27B 7/02

U.S. Cl. 432—14 **20 Claims**



1. A method of heat treating pulverous raw material by means of a suspension heat exchanger connected to the material inlet end portion of a rotary kiln including a first multistage cyclone string preheater having at least two cyclone preheater stages defining a heat exchange zone in which pulverous raw material is brought into heat exchange relationship with hot gases, said first string having a lowermost preheater

stage which comprises at least two substantially equivalent sub-stages, at least one additional multi-stage cyclone string preheater associated with each sub-stage of said lowermost preheater stage of said first preheater string and arranged in parallel relation therewith, means to supply raw material to each of said multi-stage cyclone string preheaters, and means for directing preheated material to the rotary kiln for further heat treatment comprising:

a. directing raw material to said multi-stage cyclone string preheaters;

b. directing hot gases to each of said preheaters in a manner to contact said raw material so as to effect heat exchange between said raw material and said hot gases;

c. directing material from the penultimate preheater stage of said first string preheater so as to be entrained in hot gases prior to directing hot gases to said sub-stages of said lowermost stage of said first central string preheater;

d. dividing said hot gases and entrained raw material in said first string preheater into substantially equal divisional flows, each divisional flow being associated with a sub-stage of said lowermost stage;

e. directing each of said divisional flows to one of said sub-stages of said lowermost stage of said first string preheater;

f. separating the preheated material from said divisional gas flows in said sub-stages of said lowermost stage of said first string preheater in a manner to produce individual, separate, and substantially equal and continuous sub-flows of material; and

g. directing the preheated material from said string preheaters to the material inlet end portion of said rotary kiln for further heat treatment therein.

12. An apparatus for heat treating pulverous raw material which comprises:

a. a first raw material multi-stage cyclone string preheater having at least two cyclone preheater stages including an uppermost stage and a lowermost stage, said lowermost stage being comprised of at least two substantially equivalent preheater sub-stages;

b. at least one additional string of multi-stage preheaters associated with each sub-stage of said lowermost stage of said first string preheater, each of said additional string preheaters having at least two cyclone preheater stages including an uppermost stage and a lowermost stage;

c. means to direct raw material to said multi-stage cyclone string preheaters;

d. means to direct hot gases to said first string preheater so as to bring the pulverous material and hot smoke gases into heat exchange relationship in said first string preheater;

e. means to direct preheated raw material from the penultimate stage of said first string preheater into said hot gases prior to entering the sub-stages of said final stage of said central string preheater;

f. means to divide the flow of hot gases and raw material into separate substantially equal divisional flows, each of said divisional flows being directed to an associated sub-stage of said final preheater stage of said string preheater;

g. calcining means associated with each sub-stage of said central string preheater for at least partially calcining the raw material;

h. means to direct the preheated raw material in the form of separate and substantially equivalent raw material sub-flows from each sub-stage of the final stage of said central string preheater to the calcining means associated with each sub-stage for at least partially calcining said raw material;

i. means to feed raw material from the penultimate stage of each of said additional string preheaters to said associated calcining means; and

j. means to direct the preheated, at least partially calcined raw material from each calcining means to the lowermost stage of said associated additional multi-stage string preheaters prior to subjecting the material to further heat treatment.

4,022,569

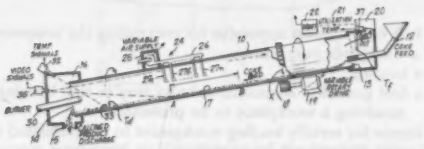
CALCINATION OF COKE

Frank John Farago; Dale Gordon Retallack, and Raman Radha Sood, all of Jonquiere, Canada, assignors to Alcan Research and Development Limited, Montreal, Canada

Filed Dec. 5, 1975, Ser. No. 638,285

Int. Cl.² F27B *15/00, 15/10*

U.S. Cl. 432—14 **15 Claims**



1. In a method of calcining coke which, while it is heated to calcine it, travels from the green coke feed end to the product coke discharge end of a sloping, rotary kiln at a speed variable with speed of kiln rotation, RPM, which method includes supplying 75% to 100% of the calcining heat by combustion of volatile material that is removed by heat from the coke, and effecting said combustion by controllably supplying air into the kiln along a longitudinal region spaced substantially from both discharge and feed ends while drawing gaseous combustion products upstream through the kiln and out the feed end, the heating of the coke being effective to raise the temperature of the traveling coke to a maximum value T_c in a longitudinal calcining zone P_c spaced from both kiln ends and desired to be situated at least about as far from the discharge end as said region, while the temperature of the coke decreases substantially during further travel to the discharge end, the improvement which comprises:

a. selecting as variables to be adjusted for control of calcination, two of the following: supply of air for combustion of volatiles, RPM of the kiln and green coke feed rate;

b. repeatedly establishing target values for kiln end temperatures respectively of coke at the discharge end, T_d, and of exhaust gas at the free end, T_f, to represent desired values of T_c and P_c;

c. each step of establishing said discharge end and feed end targets comprising measuring values of L_c in coke product samples, P_c position, T_d and T_f, which values to extent necessary are correlated in time with preceding passage of the coke of said sample through the calcining zone, determining departure, if any, of the value of L_c from a value representing desired T_c, and of P_c from desired value, and converting such L_c and P_c departures into departures of said T_d and T_f measurements from desired target values, for determining said desired target values;

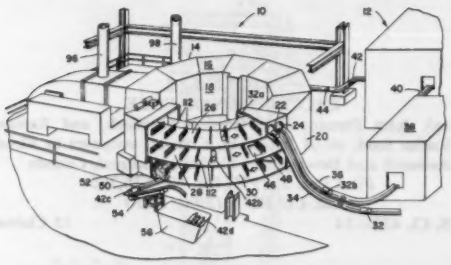
d. at least periodically measuring T_d and T_f, to determine departures thereof from the last-established target values of T_d and T_f, and converting such departures of T_d and T_f into adjustments of one or both of said selected control variables for modifying the kiln operation so that the actual T_d and T_f values can change towards agreement with said last-established target values, whereby P_c is maintained substantially in desired place and T_c substanially at desired value for effective calcination of the coke.

4,022,570

WARM FORM COOLING AND HEAT RECOVERY TUNNEL

James W. Ross, Jr., Dover, and Francis H. Bricmont, Pittsburgh, both of Pa., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 5, 1976, Ser. No. 683,587
Int. Cl.² F27D *15/02, 13/00*
U.S. Cl. 432—82 **11 Claims**



1. A heat transfer apparatus for controlling the temperature of a workpiece comprising:

a housing;

a first generally horizontal annular tray in said housing for receiving a workpiece to be preheated;

means for serially loading workpieces to be preheated onto said first tray at a first station;

means for moving said workpieces on said first tray in a first direction to a second station;

means for unloading said workpieces from said first tray at a second station spaced from said first station;

a second generally-horizontal annular tray in said housing for receiving heated workpieces;

means for serially loading said heated workpieces onto said second tray at a third station;

means for moving said workpieces on said second tray in a second direction to a fourth station;

means for unloading said workpieces from said second tray at said forth station; and,

further including hot fluid-flow means for directing fluid over said heated workpieces on said second tray thereby removing heat from said workpieces on said second tray and heating said fluid and then directing said heated fluid to flow over said workpieces on said first tray so as to assist in preheating said workpieces on said first tray.

4,022,571

INDUSTRIAL HEATING

Charles B. Gentry, Grand Rapids, and William A. Phillips, Comstock Park, both of Mich., assignors to AGM Industries, Inc., Grand Rapids, Mich.

Filed Oct. 10, 1975, Ser. No. 621,302
Int. Cl.² F27D *17/00;* **F23L** *15/02*
U.S. Cl. 432—180 **17 Claims**

1. In an industrial heating furnace for billets and the like having an elongated heating chamber, at least one fuel burner in the heating chamber for supplying heated gases to the heating chamber, and means connected to the heating chamber for withdrawing exhaust gases from the heating chamber, the improvement which comprises:

a rotary ceramic heat exchanger wheel;

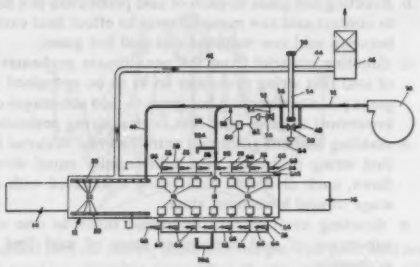
means for supplying air to a cold side of said heat exchanger wheel;

first conduit means in communication with said air supply means through said heat exchanger wheel and said elongated heating chamber for withdrawing heated air from a hot side of said heat exchanger wheel and for passing the heated air to the fuel burner as combustion air;

second conduit means in communication with the furnace and the rotary ceramic heat exchanger wheel to pass gases from the exhaust gas withdrawing means to the hot side of the rotary heat exchanger wheel;

means at a cool side of the rotary heat exchanger wheel and in communication with the second conduit means through the rotary heat exchanger wheel for withdrawing and exhausting the exhaust gases through the rotary heat exchanger wheel;

means for imparting rotary motion to the heat exchanger wheel whereby the heat of the exhaust gases is transferred to the combustion air;



a plurality of turbulating air pipes, each of which has a plurality of nozzle openings therein, the air pipes being spaced along at least a portion of the length of the elongated heating chamber and positioned within the heating chamber to direct turbulating gases against the work therein as it passes therethrough; and

third conduit means between the first conduit means and the turbulating air pipes for passing the heated air to the turbulating air pipes;

whereby heated air streams under pressure are directed against the work as it passes through the elongated chamber.

4,022,572

HOT-BLAST FURNACE WITH FOAMED SILICATE INNER LAYER

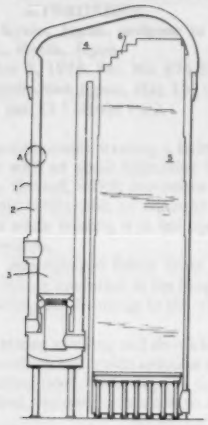
Walter Klein, Duisburg-Rahm, and Heinrich Nobis, Wiesbaden, both of Germany, assignors to Didier-Werke AG, Wiesbaden, Germany

Filed Feb. 5, 1976, Ser. No. 655,613
Claims priority, application Germany, Feb. 6, 1975, 2504852
Int. Cl.² C21B *9/00, 9/06*
U.S. Cl. 432—214 **7 Claims**

1. In a hot-blast stove or furnace of the type including an outer metal casing and an inner lining of insulating and refractory material, the improvement comprising:

means, positioned in an area immediately adjacent the inner surface of said outer metal casing, for preventing gas flow during the operation of said stove or furnace from contacting or condensing on said inner surface of said outer metal casing, said preventing means comprising a layer of

foamed glass or foamed silicate material having a structure of closed pores or cells which are closed in a gas tight



and liquid tight manner to each other, said layer being impermeable to the passage therethrough of gas or liquid.

4,022,573

HOT BLAST STOVE AND METHOD OF OPERATION

Ernest P. Kuntziger, Assenede, Belgium, assignor to S.A. des Anciens Etablissements Paul Wurth, Luxembourg, Luxembourg

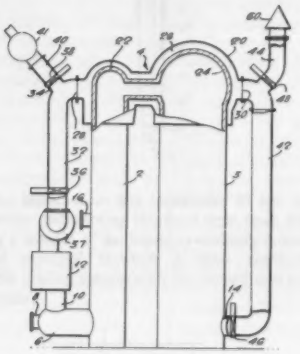
Filed Sept. 10, 1975, Ser. No. 612,219

Claims priority, application Luxembourg, Sept. 20, 1974, 70951; Jan. 30, 1975, 71761

Int. Cl.² F24H *7/00*

U.S. Cl. 432—217 **13 Claims**

1. In apparatus for heating a fluid, said heating apparatus including a combustion chamber in which heat is generated and a heat transfer chamber in which the generated heat is stored for subsequent transfer to a fluid passing therethrough, deleterious vapors being admitted to the heating apparatus during combustion of hydrocarbon fuel in the combustion chamber, the combustion and heat exchange chambers being in fluid communication at first ends via a passage at least in part defined by an imperforate wall having a first inwardly facing surface exposed to the conditions produced in said heating apparatus during combustion and recovery of the stored heat, the improvement comprising:



means positioned to the exterior of the heating apparatus and cooperating with said imperforate passage defining wall to form an enclosure, the second outwardly facing surface of said wall being exposed to the conditions existing within the enclosure and being isolated from the conditions existing within the heating apparatus; and

means for delivering a fluid to said enclosure at a pressure approximately equal to that prevailing within said heating apparatus to thereby eliminate pressure differentials across said wall and the mechanical stresses resulting from pressure differentials.

4,022,574
METHOD FOR TREATING KNITTED FABRICS CONTAINING COTTON FIBERS WITH ALKALI HYDROXIDES

Mamoru Ichihara, Kyoto, Japan, assignor to Daido-Maruta Finishing Co. Ltd., Kyoto, Japan

Filed May 5, 1975, Ser. No. 574,558
Claims priority, application Japan, May 10, 1974, 49-52762
Int. Cl.² D06M *1/02*
U.S. Cl. 8—125 **16 Claims**

1. A method for continuously treating a knitted fabric containing cotton fibers with an alkali hydroxide to improve the dimensional stability thereof, which comprises

a. impregnating said fabric with an aqueous solution of an alkali hydroxide while feeding it in the open form in the longitudinal direction;

b. subjecting the impregnated fabric from step (a) to a compressive shrinking operation in the longitudinal direction while restricting the shrinkage in the widthwise direction;

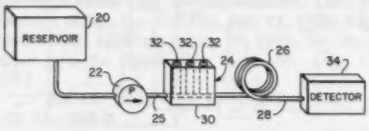
c. then before the strong swelling and shrinking of the fabric with the aqueous alkali hydroxide solution are completed, feeding the resulting fabric from step (b) to a tenter while giving an overfeed; thereby to hold it to a given width; and

d. washing the fabric while maintaining it on the tenter.

4,022,575
AUTOMATIC CHEMICAL ANALYZER

Elo Harald Hansen, Lyngby, and Jaromir Ruzicka, Narum, both of Denmark, assignors to Block Engineering, Inc., Cambridge, Mass.

Filed Sept. 15, 1975, Ser. No. 613,275
Claims priority, application Denmark, Sept. 16, 1974, 4846/74
Int. Cl.² G01N *1/14*
U.S. Cl. 23—230 R **9 Claims**



1. Method of continuous flow analysis of a liquid sample in a carrier stream, said method comprising the steps of:

forming said carrier stream as a continuous unobstructed flow of liquid in a tube, said flow being turbulent at a predetermined station within said tube and

injecting said sample through a wall of said tube into said stream as a discrete volume at or upstream from said station.

4,022,576
METHOD AND APPARATUS FOR PREPARATION OF LIQUIDS CONTAINING SUSPENDED MATERIAL FOR EXAMINATION

James E. Parker, Long Beach, Calif., assignor to I. C. L. Scientific, Fountain Valley, Calif.

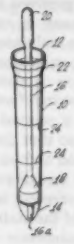
Continuation-in-part of Ser. No. 585,191, June 9, 1975, abandoned. This application May 18, 1976, Ser. No. 684,951
Int. Cl.² G01N *1/10, 1/18*
U.S. Cl. 23—230 R **21 Claims**

8. A method for preparation of a liquid containing suspended material therein for examination of the suspended material, said method comprising the steps of:

introducing a known volume of the liquid containing suspended material into a container having an open end and a closed end, and having toward its closed end a point of reduced interior cross-section, with respect to the interior cross section at the open end;

concentrating the suspended material in the closed end portion of the container;

sealing the closed end portion from the remainder of the container interior by inserting sealing means into the container, to form a fluid-tight seal between the closed end portion and the remainder of the container;



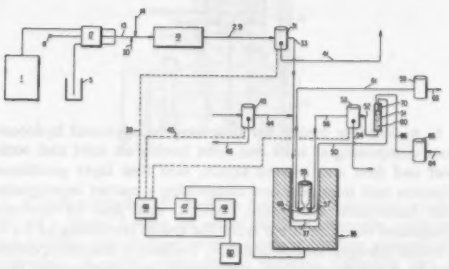
removing the liquid from the remainder of the container interior while maintaining the fluid-tight seal; and

withdrawing a sample of the liquid containing concentrated suspended material through a tube communicating through the sealing means with the closed end portion of the container.

4,022,577
AUTOMATED RADIOIMMUNOASSAY

Gary Brooker; Wesley L. Terasaki, and Michael G. Price, all of Charlottesville, Va., assignors to The University of Virginia, Charlottesville, Va.

Filed Mar. 12, 1976, Ser. No. 666,302
Int. Cl.² G01N *33/16, 23/12*
U.S. Cl. 23—230 B **33 Claims**



22. A method for continuous radioimmunoassay, which comprises:

incubating for a predetermined time period, a multiplicity of sample solutions, each of which comprises a mixture of (a) a sample possibly containing an antigen intended to be assayed, (b) a solution of a known concentration of an antigen tagged with a radioactive isotope, and (c) a solution of a known titer of antisera containing antibodies reactable with said antigen, the concentration of said antibody being selected so as to form an incubated sample containing an antibody-antigen complex, and containing unreacted antigen and tagged antigen, if said sample contains an antigen;

directing said incubated sample into a radioactivity detector which is capable of providing a kinetic measurement of radioactivity as the solution is continuously passed therethrough;

comparing the amount of radioactivity in said concentrated sample with a predetermined threshold and activating a timing means when said threshold is exceeded;

isolating said incubated sample from any additional samples

being incubated on a predetermined signal from said timing means;

separating said incubated solution into a first portion containing unreacted antigen and tagged antigen and a second portion containing antibody-antigen and antibody-tagged antigen complexes;

directing one of said portions into a radioactivity detector, detecting the amount of radioactivity in said portion while said portion is maintained in a virtually static condition, and recording said measurement;

evacuating said portion to waste;

directing a subsequent incubated sample into said radioactivity detector on a second predetermined signal from said timing means so that the next subsequent incubated sample to be assayed arrives in the radioactivity detector for the next kinetic measurement after the previous static radioactivity measurement is completed; and

comparing the ratio of the static radioactivity measurement to the kinetic measurement with a precalibrated ratio to determine the quantity of antigen being assayed.

4,022,578

DETECTOR TUBE

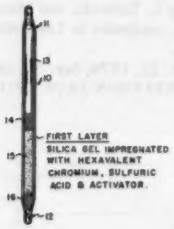
Wolfgang Kretschmer, Berlin, Germany, assignor to Auergesellschaft GmbH, Berlin, Germany

Filed May 5, 1976, Ser. No. 683,540

Claims priority, application Germany, Mar. 20, 1975, 2512687

Int. Cl.² G01N *21/12, 31/22*

U.S. Cl. 23—254 R **10 Claims**



1. A detector means for detecting halogenated hydrocarbons comprising at least one tube having an inlet and outlet port and first and second layers, said first layer positioned adjacent said inlet port and comprising a carrier impregnated with hexavalent chromium, sulfuric acid and an activator compound being selected from the group consisting of 3-, 4-, 5-valent nitrogen compounds, 5-, 7-valent iodine compounds, and 4-, 6-valent selenium compounds; and said second layer being positioned adjacent said outlet port and comprising a carrier impregnated with a benzidine derivative.

4,022,579

TRANSPORT SYSTEM FOR ANALYTICAL EQUIPMENT

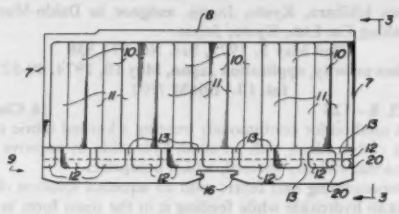
Georges Revillet, Onex; Manuel C. Sanz, Grand-Lancy, and Andre Nicole, Puplinge, all of Switzerland, assignors to Micromedic Systems, Inc., Horsham, Pa.

Filed Nov. 12, 1975, Ser. No. 631,256

Int. Cl.² B01L *9/06, 11/00*

U.S. Cl. 23—259 **13 Claims**

1. A holder for a plurality of test tubes adapted for manual and/or automatic transport to one or more service stations on a guideway system of an analytical device, comprising a body or frame having a base, a plurality of equidistantly spaced receptacles arranged in a row lengthwise of the holder and extending from the base to the top of the body, a longitudinal channel in the base extending the full length of the holder, open to the bottom of the holder along its entire length, and laterally defined by opposed inside surfaces of the sidewalls of the base, the channel having a guide structure comprising opposed groove means formed in said opposed inside surfaces of the sidewalls of the base, said groove means receiving lateral edges of a guide rail of the guideway system in the



analytical device whereby the holder is maintained upright on said guide rail, said guide structure permitting lengthwise sliding of the holder on the guide rail longitudinally of the latter.

4,022,580

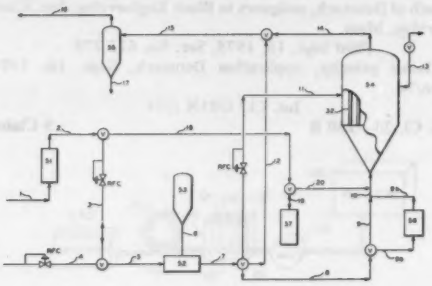
CATALYST ACTIVATION

Elton E. Rush, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 357,642, May 7, 1973, Pat. No. 3,931,045. This application Sept. 9, 1975, Ser. No. 611,744

Int. Cl.² B01J *8/00, 37/12;* F26B *17/00;* B01D *46/04*

U.S. Cl. 23—288 B **4 Claims**



1. Apparatus for activating a solid particulate catalyst deposited on the inner surface of a porous conduit, as hereinafter described, by passing an activating fluid through said catalyst deposit and said porous conduit, comprising, in combination:

a. an upright vessel having a first lower end portion defining a first end chamber, an upper second end portion defining a second end chamber, and a middle portion defining an activating chamber;

b. a plurality of porous conduits formed from a sintered metal positioned vertically within said activating chamber, said conduits being spaced apart from each other and spaced apart from the wall of said vessel, wherein said first end chamber is in communication with said second end chamber through the interior space of said conduits;

c. lower and upper seal plates for maintaining said porous conduits in a fixed position, whereby the spaces between said porous conduits are isolated from said first and second end chambers;

d. first conduit means in communication with said first end chamber for conveying a quantity of said catalyst entrained in said activating fluid, said quantity being sufficient to cover the inner surfaces of said porous conduits to a predetermined depth, and for thereafter conveying a stream of said activating fluid;

e. second conduit means in communication with said spaces in said activating chamber surrounding said porous conduits for exhausting said activating fluid;

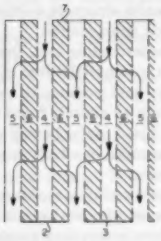
f. third conduit means in communication with said spaces in said activating chamber surrounding said porous conduits for passing a stream of displacing medium thereto;
g. fourth conduit means in communication with said second end chamber for conveying a stream of said catalyst entrained in said displacing medium therefrom;
h. first valve means in said first conduit means;
i. second valve means in said second conduit means;
j. third valve means in said third conduit means;
k. fourth valve means in said fourth conduit means;
l. means in communication with said first conduit means for introducing a catalyst charge to said first conduit means whereby said catalyst is carried by said activating fluid into said first end chamber thence into said activating chamber and deposited on the inner surface of said porous conduits; wherein each of said first, second, third and fourth valve means has at least two positions, the first position of said first and second valve means being open and the second position being closed, and the first position of said third and fourth valve means being closed and the second position being open, whereby in the first valve position, said activating fluid flows through said first conduit means into said first end chamber thence into said activating chamber and through said catalyst deposit and said wall of said conduits into said spaces surrounding said conduits thence through said second conduit means; and whereby in said second valve position, said displacing medium flows through said third conduit means into said spaces surrounding said porous conduits thence through the walls of said porous conduits, thereby displacing said catalyst deposit therefrom, and carrying the thus-displaced catalyst into said second end chamber thence through said fourth conduit means.

4,022,581

DEVICE FOR THE RECOVERY OF NOBLE METALS

Hermann Rudorfer; Anton Wagner; Franz Prammer, all of Linz, and Friedrich Klausner, Pasching, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

Division of Ser. No. 487,803, July 11, 1974, Pat. No. 3,954,449. This application Jan. 29, 1976, Ser. No. 653,626
Claims priority, application Germany, July 13, 1973, 2335712
Int. Cl.² B01J *8/00;* **B01D** *39/06, 46/30*
U.S. Cl. 23—288 R **6 Claims**



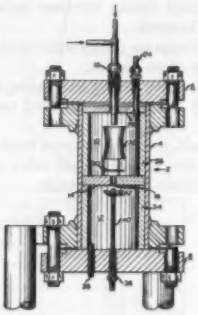
1. A device for the recovery of a noble metal from a combustion furnace of the type having a noble metal gauze arranged across the furnace in a direction transverse to the flow of gas therethrough, said device comprising:
a noble metal absorbing and intercepting bed supported on a base, said bed being in the form of channels defined by gas permeable walls supported on said base and extending in a direction transverse to said gauze, a first plurality of said channels being filled with granular acid-soluble alkaline earth metal oxide material, said material filled channels having a thickness, taken in the direction of gas flow therethrough, of 20 to 40 mm, said material filled channels separating a second plurality of open channels, a first portion of said open channels being open only at the ends thereof toward said gauze and comprising gas inlet channels, a second portion of said open channels being open only at the ends thereof farthest spaced from said gauze and comprising gas outlet channels, whereby gas flows from said furnace into said inlet channels and then laterally through said material filled channels into said outlet channels, said bed having a total external gas incident surface of 1.5 to 20 times the cross-sectional area encompassed by said material filled channels and said open channels taken in a plane parallel to said gauze.

4,022,582

CORROSION-RESISTANT REACTOR SUITABLE FOR HIGH TEMPERATURE/HIGH PRESSURE OPERATION

Rector P. Louthan, and Donald H. Kubicek, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 12, 1976, Ser. No. 648,447
Int. Cl.² B01J *3/04*
U.S. Cl. 23—290 **5 Claims**

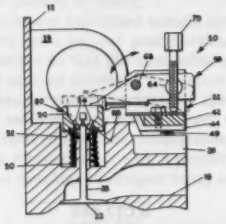


1. A high temperature reaction apparatus consisting essentially of a vessel having an outer shell of generally uniform cross-section, top closure means, bottom closure means and comprising, in axial contiguity, a reaction chamber and a quench chamber, said reaction chamber and said quench chamber being separated by a partition having an opening to provide communication therebetween,
said top closure means being adapted with inlet means for simultaneously introducing at least two reactants into said reaction chamber,
wherein the side wall of said reaction chamber is lined with a ceramic material and wherein the upper portion of said reaction chamber, defined by said top closure, is lined with a ceramic material,
baffle means positioned within said reaction chamber above said opening in said partition and a venturi mixer positioned within said reaction chamber above said baffle means,
wherein the side wall of said quench chamber is lined with a ceramic material,
said bottom closure means being adapted with quenching means and oulet means, said quenching means comprising a quench tube extending upwardly into said quench chamber to a point below said opening in said partition, said quench tube having an overflow reservoir to maintain a pool of quench medium therein.

4,022,583
METHODS FOR ASSEMBLING AND DISASSEMBLING VALVE ASSEMBLIES

James A. Kammeraad, Holland, Mich., assignor to K-Line Industries, Inc., Holland, Mich.

Division of Ser. No. 514,097, Oct. 11, 1974, Pat. No. 3,979,811. This application Feb. 17, 1976, Ser. No. 658,400
Int. Cl.² B23P 11/00
U.S. Cl. 29—156.7 R 9 Claims



1. A method of disassembling valve assemblies in internal combustion engines, said valve assemblies being of the type including a valve, a valve spring, a spring retainer and a plurality of keepers for said retainer, said method comprising the steps of:

1. providing tools including pivotal tool means for depressing said valve springs and hollow, cylindrical tool means for engaging said spring retainer including means for releasing said keepers;
2. mounting said tools on the cylinder head and at least one valve assembly of an engine;
3. depressing said valve spring and spring retainer with said tools until said keepers are released onto said releasing means; and
4. withdrawing said released keepers from the valve assembly and thereafter releasing said valve spring and raising said spring retainer with said tools.

4,022,584
SINTERED CERMETS FOR TOOL AND WEAR APPLICATIONS

Erwin Rudy, 15750 NW. Oakhill Drive, Beaverton, Oreg. 97005

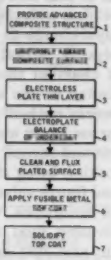
Filed May 11, 1976, Ser. No. 682,340
Int. Cl.² B22F 3/00; C22C 29/00
U.S. Cl. 228—122 9 Claims

1. A composition of material consisting essentially of aluminum oxide, magnesium oxide, refractory transition metal diborides, refractory transition metal carbides and nitrides and alloying metals selected from the group consisting of the iron metals, chromium, molybdenum and tungsten, in which the aluminum oxide comprises at least 48 weight percent of the composition, the refractory transition metal diborides comprise from 5 to 50 weight percent of the composition, the refractory transition metal carbides and nitrides comprise from 0 to 35 weight percent of the composition, in which said magnesium oxide comprises between 0.3 and 3 weight percent of the composition and the alloying metals comprise from 0 to 6 weight percent of the composition.

4,022,585
METHOD FOR SEALING COMPOSITES AGAINST MOISTURE AND ARTICLES MADE THEREBY

Samuel Kaye, LaJolla, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed Apr. 21, 1975, Ser. No. 570,144
Int. Cl.² B23P 3/00; C25D 5/50, 5/00, 5/10
U.S. Cl. 428—551 17 Claims



1. A moisture impervious composite structure comprising:
a structure comprising fibers embedded in a synethetic resin matrix;
an adherent metallic undercoating covering the surface of said structure;
a uniform, non-porous, moisture impervious fusible metal top coat covering the surface of said undercoat, said top coat solidified from a fused state in place over said undercoat;
said top coat being substantially free of open paths between its surfaces.

3. The structure according to claim 1 wherein said undercoat comprises copper and said top coat comprises a mixture of from about 48 to about 52 weight percent tin and from about 52 to about 48 weight percent indium.

4. The structure according to claim 3 wherein said undercoat has a thickness of from about 0.00025 to about 0.00035 inch and said top coat has a thickness of from about 0.2 to about 0.6 mil.

5. The method of forming a moisture impervious coating on composite structures which comprises the steps of:
providing a composite structure comprising fibers embedded in a synthetic resin matrix;
forming a metal undercoating over the structure surface;
forming a top coat substantially free of open paths between its surfaces over said undercoat by solidifying a fused metal coating from an entirely fused state in place on said undercoat, said fused metal having a fusion temperature below the temperature at which degradation of said synthetic resin occurs.

15. The method of forming a moisture impervious coating on composite structures whichs comprises the steps of:
providing a structure comprising graphite fibers embedded in a synthetic resin matrix material;
abrading the structure surface to produce a uniform dull surface;
forming an undercoat on said surface by electroless plating at least one metal selected from the group consisting of copper, nickel chromium, silver, mixtures thereof and multi-layers thereof;
assuring a clean surface on said undercoat;
forming a top coat over said undercoat by solidifying a fused metal coating in place on said undercoat, said fused metal coating comprising an eutectic mixture of at least two metals selected from the group consisting of bismuth, tin, lead, cadmium, and indium, the fusion temperature of said eutectic mixture being below the temperature at which damage to said synthetic resin matrix occurs.

4,022,586

AUSTENITIC CHROMIUM-NICKEL-COPPER STAINLESS STEEL AND ARTICLES

Ronald Harry Espy, Randallstown, Md., assignor to Armco Steel Corporation, Middletown, Ohio

Continuation-in-part of Ser. No. 888,165, Dec. 29, 1969, abandoned, which is a continuation of Ser. No. 580,201, Sept. 19, 1966, abandoned. This application May 12, 1975, Ser. No. 576,367

Int. Cl.² C22C *38/20, 38/26, 38/28*

U.S. Cl. 75—125 9 Claims

1. Austenitic stainless steel having a work-hardening rate lower than the conventional austenitic chromium-nickel stainless steel and upon cooling after having been welded by the electric arc in the presence of an inert gas characterized by freedom from incipient cracking in the heat-affected zone, said steel consisting of about 17 to about 19% chromium, about 8 to about 10% nickel, about 3 to about4% copper, up to about 2% manganese, about 0.01 to about 0.07% carbon, at least one ingredient selected from the group consisting of at least 0.10% but not more than 0.5% columbium-tantalum, with the columbium-tantalum content being less than 8 times the carbon content, and at least 0.10 but not more than 0.25% titanium, with the titanium content being less than 4 times the carbon content, and remainder iron.

4,022,587

PROTECTIVE NICKEL BASE ALLOY COATINGS

Stanley T. Wlodek, Indianapolis, Ind., assignor to Cabot Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 463,659, April 24, 1974, abandoned. This application Sept. 8, 1975, Ser. No. 611,201

Int. Cl.² B32B *15/00*

U.S. Cl. 75—171 5 Claims

1. An article of a nickel or cobalt base alloy bonded directly to a coating having a composition consisting essentially of about 20–60% Cr, 6–11% Al, 0.01–2.0% of a reactive metal selected from the group consisting of yttrium, lanthanum and cerium and the balance essentially Ni and characterized by resistance to oxidation and corrosion at elevated temperatures and resistance to crack nucleation at high stress.

4,022,588

OXIDATIVE CHEMICAL REMOVAL OF PYRITIC SULFUR FROM COAL BY MANGANESE, VANADIUM, AND CERIUM OXIDANTS

Ralph M. Dessau, Edison, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,330

Int. Cl.² C10L *9/10*; C10B *57/00*

U.S. Cl. 44—1 R 6 Claims

1. In an oxidative solubilization process for reducing the pyritic sulfur content of coal wherein coal is reacted with an aqueous solution of metal oxidant and a coal product having a reduced content of pyritic sulfur is thereafter recovered, the improvement which comprises using a metal oxidant selected from the group consisting of manganese, vanadium and cerium oxidants.

4,022,589

FUEL ADDITIVE PACKAGE CONTAINING POLYBUTENE AMINE AND LUBRICATING OIL

Henry E. Alquist, Bartlesville, Okla., and George D. Ebersole, Lenox, Iowa, assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 17, 1974, Ser. No. 515,606

Int. Cl.² C10L *1/22*

U.S. Cl. 44—58 6 Claims

1. A fuel composition comprising a liquid hydrocarbon fuel having therein from 10 to 50 pounds per 1,000 barrels of said fuel of a polybutene amine having an average molecular weight in the range of 600 to 3,000 and from 100 to 500 pounds per 1,000 barrels of said fuel of a paraffinic hydrocarbon oil having a viscosity at 100° F between 250 and 500 SUS.

4,022,590

LOW POUR WAXY RESIDUAL FUEL OILS

Abraham Morduchowitz, Monsey, and Jerzy Jozef Bialy, La-Grangeville, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,315

Int. Cl.² C10L *1/18*

U.S. Cl. 44—80 8 Claims

1. A low-pour, waxy, residual fuel oil composition comprising a blend of a major amount of a waxy residual fuel oil and about 0.030 to about 0.50 weight percent of a liquid polymer of a normal alpha-olefin having from about 10 to about 16 carbon atoms and having a number average molecular weight of about 500 to about 5,000.

4,022,591

COAL GASIFICATION APPARATUS

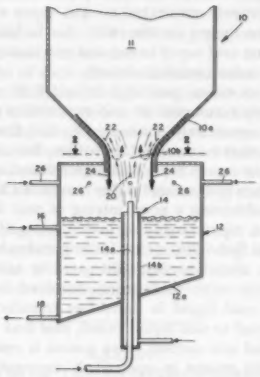
Gernot Staudinger, Amsterdam, Netherlands, assignor to Shell Internationale Research Maatschappij B.V., Netherlands

Continuation of Ser. No. 602,325, Aug. 6, 1975, abandoned. This application June 14, 1976, Ser. No. 695,600

Claims priority, application Netherlands, Aug. 28, 1974, 7411433

Int. Cl.² C10J *3/50, 3/52*; F23D *19/00*

U.S. Cl. 48—76 8 Claims



1. An apparatus for the gasification of coal comprising:

a vertical reactor forming a reaction zone for partial combustion of powdered coal with a gas containing oxygen for producing a product gas and provided with a bottom having a constricted passageway;

outlet means for removing product gas from the vertical reactor; and

means for supplying coal and reactant gases to said reactor and for removing ash particles from said reactor via said constricted passageway, said means including:

a chamber connected with the reactor bottom and disposed about the constricted passageway;

means for supplying coal and reactant gases through the reactor disposed in the chamber and opening opposite the constricted passageway;

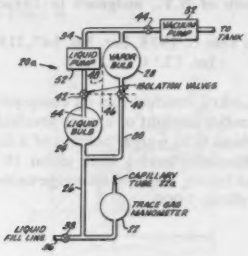
inlet means for supplying and maintaining water in the chamber for quenching ash particles passing from the vertical reactor through the constricted passageway and for cooling the means for supplying said coal and reactant gases; and

outlet means for removing solidified slag particles from the chamber.

4,022,592
LIQUID DEGASSING DEVICE

Elric W. Saaski, Richland, Wash., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Oct. 14, 1975, Ser. No. 621,876
Int. Cl.² B01D *19/00*
U.S. Cl. 55—189 6 Claims



1. Means for degassing a liquid comprising:

a normally lower liquid vessel for containing a liquid to be degassed;

a normally upper vapor vessel for containing gases and vapor to be removed;

evacuation means;

first conduit means connecting said liquid and vapor vessels to said evacuation means;

first valve means provided in said first counduit means operatively connected to said liquid vessel on one side and operatively connected to said vapor vessel and said evacuation means on the other, for isolating said liquid vessel from said vapor vessel and evacuation means when said first valve means is closed;

second valve means provided in said first conduit means operatively connected to said evacuation means on one side and operatively connected to said first valve means and said vapor vessel on the other, for closing off said evacuation means from said vapor vessel and said liquid vessel when said second valve means is closed; and

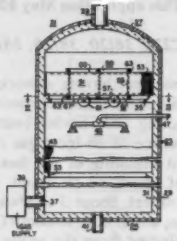
means for obtaining a good mixing of said liquid and said gases and vapor largely in said liquid and vapor vessels when said first valve means is open and said second valve means is closed so that said gases in said vapor reach equilibrium with said gases dissolved in said liquid, whereby said liquid is thereafter transferred from said vapor vessel to said liquid vessel, said first valve means is closed and said second valve means is opened, and said evacuation means is operatively connected to remove said gases and vapor in said vapor vessel.

4,022,593
MIST ELIMINATION

Bernard J. Lerner, 727 Orchard Hill Drive, Pittsburgh, Pa. 15235

Filed May 5, 1975, Ser. No. 574,268
Int. Cl.² B01D *47/02*
U.S. Cl. 55—90 13 Claims

1. For use in liquid-gas contacting apparatus, a mist eliminator including a porous pad for removing mist from a mist-containing gas of said liquid-gas contacting apparatus, which flows through said porous pad, fibrous-body means, and means for maintaining said fibrous-body means in contact with a surface of said pad for draining a liquid, resulting from the mist removed from said mist-containing gas, which accumulates above said surface, said fibrous-body means being interposed in the path of flow of said mist-containing gas to said surface of said pad but having a cross-sectional dimension which is relatively small compared to the cross-sectional dimension of said surface, said fibrous-body means thus constituting an obstruction to said gas flow of cross-sectional area which is small compared to the area of said surface so as to provide for low-resistance flow for a mist-laden gas through said fibrous-body means and said surface, the contact region between said pad and said fibrous-body means being less than the maximum transverse cross-sectional area of said fibrous-body means such that said liquid being drained flows through

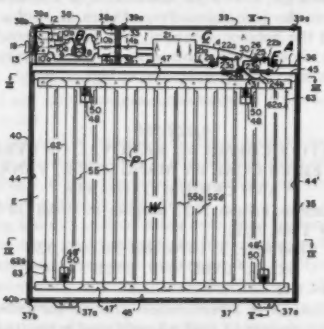


certain portions of said fibrous-body means, within said fibrous-body means, while substantially no streams flow through other portions of said fibrous-body means, whereby said fibrous-body means shields the liquid draining from said pad from a gas flowing in said liquid-gas-cpontacting apparatus.

4,022,594
ELECTROSTATIC PRECIPITATOR

Edward L. Baysek, 141 Biscayne Terrace Extension, Pittsburgh, Pa. 15212

Filed May 2, 1975, Ser. No. 573,846
Int. Cl.² B03C *3/02*
U.S. Cl. 55—139 27 Claims



1. An improved apparatus for electrically precipitating foreign particles such as dust that are present in a gaseous medium such as air which comprises, a frame defining a through-extending open central portion, a group of continuously connected longitudinally extending spaced-apart configurated electrically conductive plate portions mounted within said open portion, a continuous ionizing wire length having a pair of opposed rows of end-positioned connecting loop portions and a series of substantially parallel length portions in a spaced relation along and between adjacent pairs of said plate portions, cooperating spring means; a pair of opposed and spaced-apart bar members extending along outer reaches of said rows of connecting loop portions and means for maintaining said bars members in a self adjusting outwardly flexibly spread-apart positioned relation with respect to each other for positioning said rows in an electrically insulated self-adjustably tensioned relation along said bar members within the open central portion of said frame, means independent of said spring means for applying electric current of positive potential

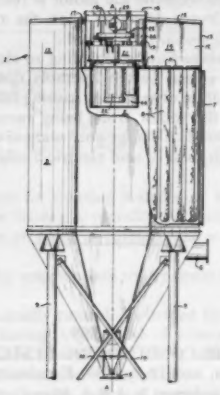
to said continuous wire for electrically charging foreign particles in a gaseous medium moving through said open portion, and means for applying electric current of opposite potential to said plate portions for collecting the charged particles thereon.

4,022,595

SELF-CLEANING FILTER ARRANGEMENT

Richard D. Noland, Overland Park, Kans., assignor to Air-O-Matics, Inc., Kansas City, Mo.

Filed Jan. 30, 1976, Ser. No. 653,885
Int. Cl.² B01D *46/04*
U.S. Cl. 55—273 **5 Claims**



1. In a bag filter device having a housing defining a filter chamber having an inlet and an outlet and a plurality of filter bags therein each positioned in a gas flow path for passage of a gas to be filtered from the outside to the inside of the bags, said bag filter device having wall means flow-connected to said filter chamber and defining a plurality of plenum chambers, one of said wall means of each of said plenum chambers having means defining at least one inlet through which filtered gas enters from a respective filter bag, one other of said wall means of each of said plenum chambers having an outlet through which filtered gas is normally discharged therefrom, means for directing cleaning gas intermittently into each of said plenum chambers to generate and momentarily maintain a pressure therein which is greater than that which normally exists in said filter chamber and comprising:

a rotatable blower casing having a gas inlet and a tangential gas outlet, said tangential outlet during rotation thereof being sequentially alignable with an outlet of each of said plurality of plenum chambers, blower means directing gas into said casing inlet and out said casing tangential outlet providing reverse gas to clean said bags,

a plurality of spaced rollers mounted between said plenum chamber wall means and said blower casing and supporting said blower casing for free rotation in response to the tangential discharge of gas from said casing tangential outlet,

c. wall means positioned around said blower casing and defining a circular track, power means for rotating said circular track; and

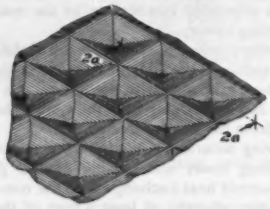
d. ratchet means rotatably mounted on said blower casing and having portions thereof sequentially movable into and out of said circular track upon rotation of said track, said ratchet means having other portions thereof movable into and out of engagement with the spaced plenum chamber outlet defining wall means upon rotation of said circular track and movement of said ratchet means portions into and out of said circular track, thereby intermittently retaining said blower casing tangential outlet in communication with a respective one of the plenum chamber outlets and then permitting movement of same under the urging of said tangential discharge to communicate with an adjacent one of the plenum chamber outlets.

4,022,596

POROUS PACKING AND SEPARATOR MEDIUM

George C. Pedersen, P.O. Box 570085, Perrine, Fla. 33157

Filed Aug. 27, 1975, Ser. No. 608,099
Int. Cl.² B01D *39/04*
U.S. Cl. 55—528 **17 Claims**



1. A porous contacting medium characterized by

a. a first set of strands of material;

b. each strand of said first set being substantially straight and parallel to every other strand in the set;

c. each strand of said first set being spaced from every other strand in the set both vertically and horizontally;

d. a second set of strands of material interleaved with said first set;

e. each of the strands of said second set being substantially parallel to every other strand in the set;

f. said strands of said first set being perpendicular to the strands of said second set;

g. the lengths of each strand of said second set extending in interleaved fashion through the strands of said first set in a geometric orientation to fit the vertical and horizontal offset spacing of each strand in said first set;

h. each of said strands of said second set including a plurality of substantially straight line portions with said portions connected at angles to provide said geometric orientation; and

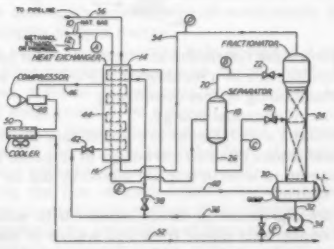
i. said angled geometric orientation of said second set and said offset spacing of said first set giving said medium a thickness in cross section greater than the thickness thereof prior to said geometric orientation.

4,022,597

SEPARATION OF LIQUID HYDROCARBONS FROM NATURAL GAS

Kenneth H. Bacon, Tulsa, Okla., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Apr. 23, 1976, Ser. No. 679,834
Int. Cl.² F25J *3/02*
U.S. Cl. 62—28 **9 Claims**



1. A method for treating natural gas to produce natural gas

liquids consisting principally of ethane and higher boiling point hydrocarbons and a pipeline gas consisting principally of methane comprising:

a. passing the natural gas through a heat exchanger in countercurrent indirect heat exchange with separate streams of the pipeline gas and natural gas liquids to cool and partially condense the natural gas;

b. separating the partially condensed natural gas into vapors and condensate;

c. expanding the vapors to a lower pressure and delivering the expanded vapors into the top of a fractionating tower;

d. expanding the condensate to a lower pressure and delivering the expanded condensate to the midpoint of the fractionating tower;

e. withdrawing pipeline gas from the top of the fractionating tower, returning it through the heat exchanger in countercurrent heat exchange with the natural gas as defined in step (a), and discharging from the system the pipeline gas effluent from the heat exchanger;

f. withdrawing natural gas liquids from the bottom of the fractionating tower and passing natural gas liquids in countercurrent heat exchange with the natural gas as set forth in step whereby at least a part of the natural gas liquids is vaporized;

g. returning a portion of the vaporized natural gas liquids from the heat exchange with the natural gas into the lower end of the fractionating tower to supply heat at the lower end of the fractionating tower for the fractionation; and

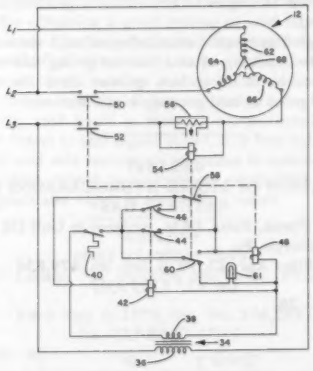
h. discharging from the system natural gas liquids not returned to the fractionating tower.

4,022,598

PROTECTION SYSTEM FOR ELECTRIC MOTOR

Eugene F. Gucwa, Jr., Cazenovia; Rudy C. Bussjager, Minoa, and Arthur C. Grantham, Liverpool, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,605
Int. Cl.² F25D *29/00*
U.S. Cl. 62—164 **6 Claims**



1. A protection system for an electrical motor employed to drive a compressor of a mechanical refrigeration unit used in an air conditioning system comprising:

a source of electrical energy;

thermostatic switch means to connect said electrical motor to said source of electrical energy in response to a sensed temperature level in a space served by the air conditioning system;

fault sensing means in direct contact with said motor to disconnect said motor from said source of electrical energy upon the occurrence of a fault in said motor;

current sensitive means electrically connected to said motor and being in a first state when the motor is connected to said source of electrical energy, and a second state when the motor is disconnected from said source of electrical energy;

lockout means including holding means operable between first and second states, with said holding means being placed in its second state in response to the current sensitive means being placed in its first state, said holding means remaining in its second state when the motor is disconnected from said source of electrical energy by said fault sensing means to prevent said motor from being reconnected to said source of electrical energy even though said thermostatic switch means senses a requirement for conditioned air, said holding means being placed in its first state upon the opening of said thermostatic switch means whereby the motor is reconnected to said source of electrical energy upon the reclosing of said thermostatic switch means; and

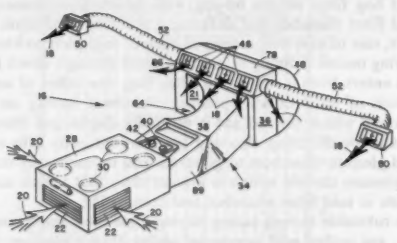
said holding means further including an electrical relay and a normally closed switch operably connected thereto, said energization of said relay causing said switch to open to prevent the motor from being reconnected to said source of electrical energy until said switch recloses upon the deenergization of said electrical relay.

4,022,599

AIR CONDITIONING SYSTEM

Bobby L. Wilson, and Thomas W. Earnheart, both of Grand Prairie, Tex., assignors to A.R.A. Manufacturing Company, Grand Prairie, Tex.

Filed Sept. 22, 1975, Ser. No. 615,513
Int. Cl.² B60H *3/04*
U.S. Cl. 62—244 **7 Claims**



1. An air conditioning system for an automobile having an engine, dash area, transmission tunnel and spaced apart front seats therein; said system including a compressor operated by said engine for pressurizing a refrigerant, a condenser for receiving said refrigerant from said compressor, said condenser feeding refrigerant through appropriate conduits to an evaporator, thereafter refrigerant flows back to said compressor, improvements comprising:

console means inside said automobile over said transmission tunnel extending from between said front seats to under said dash area, said console means enclosing said evaporator in a forward portion thereof;

air intake means located at a rear portion of said console means between said front seats;

blower means located in said console means for drawing air in said air intake means and forcing the air forwardly through said console means and said evaporator located therein to cool said air, cooled air being changed in direction of movement by a forward wall of said console and discharged toward the rear of said automobile through air outlet means under said dash area of said automobile.

4,022,600

APPARATUS FOR FREEZING COOKED RICE

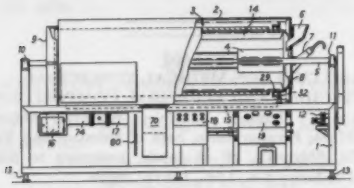
Fumio Mutoh, 13-15 Minami 2-chome, Meguro, Tokyo; Hiroshi Koizumi, 3-5, Namiki 2-chome, Sagamiwara, Kanagawa; Jun Yamasaki, 11-21-305, Kurihara 2-chome, Adachi, Tokyo, and Toshifumi Ando, 3-206, Koyosokushin-Kutaku Yurigaoka, Niromiya, Naka, Kanagawa, all of Japan

Division of Ser. No. 608,605, Aug. 28, 1975. This application June 21, 1976, Ser. No. 697,819

Claims priority, application Japan, May 21, 1975, 50-60562

Int. Cl.² F25D *25/02*

U.S. Cl. 62—381 14 Claims



1. An apparatus for freezing boiled rice, which comprises:

a rotary drum having a plurality of plate blades radially provided on an inner circumferential wall of said rotary drum;

drive means for rotating said rotary drum at a substantially low speed;

a rotary shaft axially centrally provided through said rotary drum and having a plurality of rotary blades radially secured thereto, means for rotating said rotary shaft at a higher speed than said rotary drum;

first and second covers provided, respectively, on an inlet side end and outlet side end of said rotary drum to cover the respective ends;

a hopper provided in said inlet cover in such a fashion as to feed boiled rice toward a central portion of an inner bottom face of said rotary drum, at least one supply pipe provided in said inlet cover for supplying refrigerant as low temperature liquefied gas such as carbon dioxide toward the same central portion of the inner bottom face of said rotary drum; and

a discharge port divided in said outlet cover for dicharging together the boiled rice thus frozen and the used refrigerant to the outside.

4,022,601

METHOD AND APPARATUS FOR COATING A GLASS SUBSTRATE

John F. Sopko, Levelgreen, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

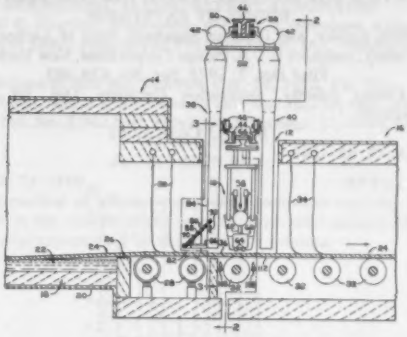
Filed June 2, 1975, Ser. No. 583,333

Int. Cl.² C03C *17/22*

U.S. Cl. 65—60 D 11 Claims

1. In a method of coating a glass ribbon wherein the coating method includes the step of forming a glass ribbon in a forming chamber having a controlled atmosphere and means positioned adjacent an exit end of the forming chamber for maintaining the atmosphere in the forming chamber and for minimizing heat convection from the forming chamber; advancing the glass ribbon along a predetermined path out of the forming chamber toward coating means, coating a first surface of the ribbon at the coating means, the ribbon as it advances past the coating means warps, the improvement comprising:

directly heating a second surface of the glass ribbon opposite the first surface in an amount sufficient to substantially reduce the warpage; and practicing said heating step adjacent the second surface of



the glass ribbon below a coating zone of the coating means.

4,022,602

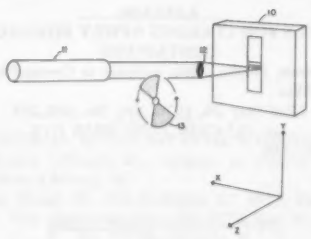
METHOD OF FABRICATING LOW-LOSS CHANNEL OPTICAL WAVEGUIDES

Theodore G. Pavlopoulos, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 30, 1975, Ser. No. 627,495

Int. Cl.² G02B *5/14*; C03B *32/00*

U.S. Cl. 65—102 4 Claims



1. A method of fabricating low-loss channel optical waveguides comprising:

selecting a color filter glass material highly absorptive of light energy within a determinable color filter wavelength region and highly transmissive of substantially all other wavelengths of light energy;

focusing a laser beam emitting light energy including said color filter wavelength region on a planar surface of the selected material in sufficient concentration to cause partial evaporation of its surface;

causing relative linear movement between the laser beam focal point and the selected color filter glass material in the focal plane of the laser beam; and

controlling the rate of such relative linear movement to produce grooves in the surface of the selected color filter glass material by absorption of laser energy within said color filter wavelength region, defining optical waveguiding paths immediately beneath the grooves due to resultant localized change of index of refraction.

4,022,603
DEVICE FOR MANUFACTURING HOLLOW PROFILED BODIES BY EXTRUSION

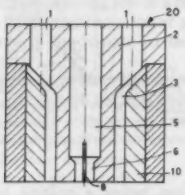
Erwin Roeder, and Edmund Steinbeck, both of Aachen, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,303

Claims priority, application Germany, Oct. 10, 1974, 2448256

Int. Cl.² C03B 37/02

U.S. Cl. 65—145 **1 Claim**



1. An extrusion die for forming hollow elongated bodies, comprising a mandril having a base part and a longitudinally extending part; an adjusting ring; and means for supporting the ring about said extending part for longitudinally slidable movement with respect to the mandril, said extending part and said ring defining a longitudinally extending gap therebetween; said mandril comprising at least one first passage disposed through said base part and communicating with said gap for conducting material to be extruded to form an outer portion of an elongated body, said ring having a flow constricting end arranged such that upon longitudinal movement of said ring toward said base part said end restricts flow of material from said first passage to said gap; said mandril additionally comprising at least one second passage disposed through said extending part for conducting material to be extruded to form a core portion of said elongated body.

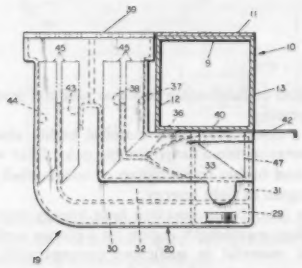
4,022,604
APPARATUS FOR COOLING NEWLY FORMED GLASS CONTAINERS

Roy E. Dawson, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed May 20, 1976, Ser. No. 688,203

Int. Cl.² C03B 27/00; E03B 3/18

U.S. Cl. 65—348 **6 Claims**



1. In apparatus for cooling newly formed glass containers that are placed on a dead plate prior to being swept onto a moving conveyor, comprising:

a generally L-shaped, hollow casting having the horizontal leg of said casting underlying the conveyor;

a plurality of discrete openings formed in the bottom of said tunnel communicating with passages in said casting;

means supplying air under pressure to said tunnel;

a plurality of individual passages in said casting extending first downwardly then horizontally and finally vertically upward;

a perforate dead plate for supporting the glass containers, overlying the upper end of said casting; and

channel means supported in said passages for reducing the turbulence of the air flowing therethrough, whereby the noise level is reduced at a position above the apparatus.

4,022,605
STABILIZED NON-MEDICAL FUNGICIDAL, BACTERICIDAL AND ALGICIDAL COMPOSITION

Kazumi Konya, Shimizu; Yoshihiro Konagai, Shizuoka; Makoto Muto; Hironari Sato, both of Shimizu, and Yoshio Takahashi, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,074

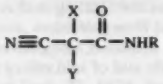
Claims priority, application Japan, June 29, 1974, 49-74644

Int. Cl.² A01N 9/02

U.S. Cl. 71—67 **8 Claims**

1. A stabilized microbiocidal composition which consists essentially of:

a microbiocidally effective amount of a halocyanoacetamide having the formula


(I)

wherein

X represents a halogen atom;

Y represents a halogen atom or a hydrogen atom; and

R represents hydrogen atom or a lower alkyl group containing from 1 to 8 carbon atoms;

a stabilizer of a diol selected from the group consisting of ethylene glycol, 1,2-propanediol, 1,3-propanediol, 1,2-dihydroxybutane, 2,3-dihydroxybutane, 1,3-dihydroxybutane, 1,4-dihydroxy-2-butyne, 1,4-dihydroxy-2-butene,1,5-dihydroxypentane, 1,6-dihydroxyhexane, 2,5-dihydroxyhexane, 1,7-dihydroxyheptane and 2,5-dihydroxy-(3)-hexene, wherein the amount of stabilizer is 0.1 – 5 wt.% relative to the amount of halocyanoacetamide; and

a solvent.

4,022,606
ANTIMICROBIAL USE OF ω-AMINOCARBOXYLIC ACID AMIDES

Jens Conrad, Hilden Rhld.; Harald Schnegelberger, Leichlingen Rhld.; Hans-Werner Eckert, Dusseldorf; Ferdi Saygin, Erkrath, and Günter Koppensteiner, Melsungen, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

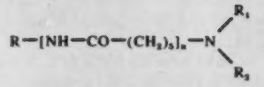
Division of Ser. No. 515,839, Oct. 18, 1974, abandoned. This application Sept. 9, 1975, Ser. No. 611,618

Claims priority, application Germany, Nov. 3, 1973, 2355026

Int. Cl.² A01N 9/00, 9/20

U.S. Cl. 71—67 **4 Claims**

1. A process for combatting microorganisms selected from the group consisting of gram-positive bacteria, gramnegative bacteria, fungi and algae which consists in contacting said microorganisms with a toxic amount of a ω-aminocarboxylic acid amide of the formula



wherein R is an aliphatic hydrocarbon residue having from 10 to 14 carbon atoms selected from the group consisting of alkyl and alkenyl, R_1 and R_2 are members selected from the group consisting of hydrogen, methyl, $—CH_2—CH_2OH$, $—CH_2—CHOH—CH_3$ and $—CH_2—CHOH—CH_2OH$, and *n* is an integer from 1 to 10, and their toxicologically-unobjectable acid addition salts.

4,022,607

SUBSTITUTED OXAZOLES AND THIAZOLES AS HERBICIDES

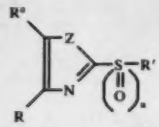
Thomas E. Jackson, Madison, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed June 9, 1975, Ser. No. 584,885

Int. Cl.² A01N 9/12, 9/14

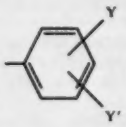
U.S. Cl. 71—88 **22 Claims**

1. The method of combatting weeds in a locus containing weeds comprising applying to the locus a herbicidally effective amount of a compound of the formula:



wherein

R^a and R are independently hydrogen, alkyl of 1 to 6 carbon atoms, phenyl or substituted phenyl of the formula:



in which

Y is fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, trifluoromethyl, phenyl or phenoxy, and

Y′ is hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms,

R′ is alkyl of 1 to 6 carbon atoms,

Z is oxygen or sulfur, and

n is 0, 1 or 2.

4,022,608

N-α-CHLOROACETYL-N-(1,3-DIOXOLAN-2-YLMETHYL)-2-ETHYL-6-METHYLANILINE AS A HERBICIDE

Sidney B. Richter, Chicago, and John Krenzer, Oak Park, both of Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 493,805, Aug. 1, 1974, Pat. No. 3,946,044. This application Dec. 17, 1975, Ser. No. 641,853

The portion of the term of this patent subsequent to Mar. 9, 1993, has been disclaimed.

Int. Cl.² A01N 9/28

U.S. Cl. 71—88 **2 Claims**

1. A herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, the compound N-α-chloroacetyl-N-(1,3-dioxolan-2-ylmethyl)-2-ethyl-6-methylaniline.

4,022,609

HERBICIDAL FLUORINATED CARBONATES

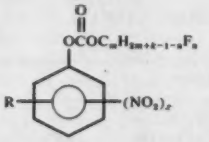
Donald E. Hardies, Wadsworth, and Jay K. Rinehart, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 299,968, Oct. 24, 1972, Pat. No. 3,852,464, which is a division of Ser. No. 76,275, Sept. 28, 1970, Pat. No. 3,742,010. This application Sept. 12, 1974, Ser. No. 505,419

Int. Cl.² A01N 9/24

U.S. Cl. 71—106 **15 Claims**

1. A method of killing weeds which comprises applying to the soil in the vicinity of the weeds a phytocidal amount of a compound represented by the structural formula:



wherein

x is 1, 2 or 3;

k is −2, 0 or 2;

m is an integer ranging from 1 to 15 when *k* is 2;

m is an integer ranging from 2 to 15 when *k* is 0 or −2;

n is an integer ranging from 1 to $(2m+k-1)$; and

R is hydrogen, lower alkyl, halo lower alkyl, lower alkenyl, halo lower alkenyl, lower alkylthio, halo lower alkylthio, lower alkenylthio, halo lower alkenylthio, lower cycloalkyl or halo lower cycloalkyl.

4,022,610

HERBICIDAL MIXED SALTS OF MAGNESIUM

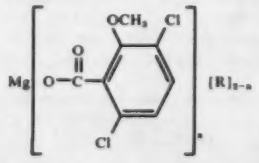
Takeo Hokama, Chicago, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 406,512, Oct. 15, 1973, Pat. No. 3,910,974. This application May 16, 1975, Ser. No. 578,058

Int. Cl.² A01N 9/24

U.S. Cl. 71—115 **2 Claims**

1. a herbicidal composition comprising an inert carrier, as an essential active ingredient, in a quantity toxic weeds, a mixed salt of magnesium having the empirical formula



wherein R is an acid radical of from 7 to 20 carbon atoms and *n* has an average value of from 0.5 to 1.5.

4,022,611

PLANT GROWTH REGULATING AGENT

Christian Vogel, Binningen, and Rudolf Aebi, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 511,321, Oct. 4, 1974, Pat. No. 3,937,730, which is a continuation-in-part of Ser. No. 366,955, June 4, 1973, abandoned. This application Dec. 18, 1975, Ser. No. 641,847

Claims priority, application Switzerland, June 6, 1972, 8345/72; Mar. 30, 1973, 4607/73

Int. Cl.[2] A01N *9/20*

U.S. Cl. 71—118 3 Claims

1. A herbicidal composition containing as active substance a herbicidally effective amount of the compound 2-ethyl-6-methyl-N-(1'-methoxyprop-2'-yl)-N-chloroacetanilide, together with a suitable carrier.

4,022,612

PRODUCTION OF ALLOYS OF IRON

William Bieloch, Johannesburg, South Africa, assignor to Electroheat (Proprietary) Limited, Johannesburg, South Africa

Filed Nov. 6, 1975, Ser. No. 629,538

Claims priority, application South Africa, Nov. 12, 1974, 74/7231

Int. Cl.[2] H05B *7/18;* C21C *5/52, 5/28*

U.S. Cl. 75—12 10 Claims

1. A process for the removal of carbon from ferrous metals comprising:

a. the preparation of a molten superheated bath of ferrous metal in an oxygen converter;

b. generating high velocity streams of hydrogen and oxygen such that water vapor is formed externally of a converter lance by the reaction of hydrogen and oxygen issuing at high velocity from said lance and such that a water vapor flame jet is formed;

c. treating the metal with said water vapor flame jet; and

d. allowing the stable volatile carbon compounds formed to separate from the metal.

4,022,613

METALLURGICAL MATERIAL AND PROCESS FOR TREATING IRON OR STEEL THEREWITH

George D. Haley, Greenville, Pa., assignor to R. C. Metals, Inc., Greenville, Pa.

Filed Aug. 28, 1975, Ser. No. 608,789

Int. Cl.[2] C21C *7/00*

U.S. Cl. 75—53 5 Claims

1. In the manufacture of iron or steel, the steps of depositing in a molten bath thereof a mixture of a ferroalloy, in oxide of the alloying element in the ferroalloy and silicon carbide, whereby the oxide of the alloying element and the silicon carbide will react in an exothermic reaction.

4,022,614

METHOD OF REFINING ALUMINUM-SILICON ALLOYS

Alex R. Valdo, Phoenix, Ariz., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 612,393, Sept. 12, 1975, Pat. No. 3,958,979, which is a continuation-in-part of Ser. No. 424,842, Dec. 14, 1973, abandoned, which is a continuation of Ser. No. 212,378, Dec. 27, 1971, abandoned, which is a continuation of Ser. No. 32,326, April 27, 1970, abandoned, which is a continuation-in-part of Ser. No. 26,751, April 8, 1970, abandoned. This application Mar. 22, 1976, Ser. No. 669,310

The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.

Int. Cl.[2] C22B *21/06*

U.S. Cl. 75—63 7 Claims

1. A method of processing an impure molten aluminum base alloy containing at least about 23 percent silicon and at least about 1.6% titanium, which method includes the step of adding to the molten alloy a solid or granular fluoride flux less dense than the alloy and having a boiling point above the alloy's liquidus temperature and in a sufficient amount to effectively reduce the titanium content of the alloy, then permitting the mixture to stand to settle out a molten alloy in which the titanium content is reduced but not entirely eliminated, and separating the settled out alloy from the flux.

4,022,615

AGGLOMERATES OF SILICON AND SILICON BASE ALLOY PARTICLES

James E. Wells, III, Kenmore, and Anthony F. Nasladka, Lockport, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 17, 1975, Ser. No. 568,984

Int. Cl.[2] C22B *1/08*

U.S. Cl. 75—130 R 4 Claims

1. Method for making agglomerates of finely divided silicon bearing particles which comprises

contacting finely divided particles of at least one material selected from the group consisting of silicon and silicon base alloys with an aqueous solution of alkali metal hydroxide to provide a wet mix and compacting the wet mix under ambient temperature conditions to provide an exothermic reaction between said finely divided particles and said alkali metal hydroxide and the formation under ambient temperature conditions of a dried agglomerate formed of said divided particles in a matrix of alkali metal silicate.

4,022,616

PHOTOGRAPHIC PROCESS INVOLVING AMPLIFICATION WITH CO (III) COMPLEXES, SILVER-DYE-BLEACHING AND COLORLESS DYE FORMERS WHICH FORM BLEACHABLE DYES

Charles Robert Barr, Rochester, and John Vincent Williams, Pittsford, both of, NY, assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 475,677, June 3, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,306

Int. Cl.[2] G03C *7/16, 7/00, 5/38, 5/32*

U.S. Cl. 96—20 20 Claims

5. A process for producing a positive colored image in an imagewise exposed photograhic element which comprises a support having coated thereon at least three separate overlying hydrophilic colloid layers containing light sensitive silver halide, said layer being sensitive to red, green and blue radiation, respectively, said layers having in association therewith substantially colorless dye-providing compounds which provide, respectively, cyan, magenta and yellow bleachable dye, each said dye-providing compound being reactive with oxidized color-forming reducing agent to yield a bleachable dye which process comprises the following steps in the order presented:

a. contacting said element with a black-and-white developer solution to thereby develop image silver while simultanously forming a low level silver fog in the non-image areas of said element of from about 0.08 optical density unit to about 20 percent of the maximum amount of silver formed in the image area of said element;

b. uniformly converting the dye-providing compounds to said bleachable dyes by contacting the black-and-white developed element with an amplifier/developer solution containing a color-forming reducing agent and a cobalt (III) metal complex amplifier oxidizing agent having a coordination number of 6 capable of entering into an oxidation-reduction reaction with the colorforming reducing agent in the presence of a catalytic silver surface;

c. silver-dye-bleaching said element to bleach said bleachable dye in proportion to the amount of metallic silver in the respective areas of said element; and

d. thereafter, removing silver halide from said element by means of a fixing solution.

4,022,617

PHOTOTHERMOGRAPHIC ELEMENT, COMPOSITION AND PROCESS FOR PRODUCING A COLOR IMAGE FROM LEUCO DYE

Hugh G. McGuckin, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 491,713, July 25, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,099
Int. Cl.² G03C 5/54, 7/00, 1/40, 1/02
U.S. Cl. 96—29 D 36 Claims

28. A process of developing an image in an exposed, diffusion transfer, photothermographic element comprising a support having thereon, in sequence,

I. a layer comprising

a. photographic silver halide in association with

b. an oxidation-reduction image-forming combination comprising

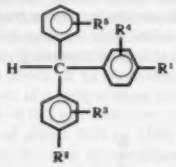
i. a non-light sensitive, organic, silver salt oxidizing agent, with

ii. an organic reducing agent,

c. a development modifier,

d. a polymeric binder for said layer (I), and

e. a leuco base dye represented by the formula:



wherein R^1 and R^2 are each

R^3, R^4 and R^5 are each amino, hydrogen, alkyl containing 1 to 6 carbon atoms or alkoxy containing 1 to 3 carbon atoms; and R^6 and R^7 are each alkyl containing 1 to 5 carbon atoms or aryl containing 6 to 12 carbon atoms; which is oxidizable to form a dye image and

II. an image receiving layer, comprising heating said layers to a temperature within the range of about 80° C to about 250° C.

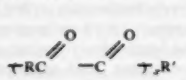
4,022,618

METHOD FOR DESENSITIZING RECORDED ORGANIC VOLUME PHASE HOLOGRAPHIC RECORDING MEDIA

Robert Alfred Bartolini, Trenton; William Joseph Burke, Princeton Junction, and Allen Bloom, East Windsor, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 10, 1975, Ser. No. 566,706
Int. Cl.² G03C 5/04
U.S. Cl. 96—27 H 6 Claims

1. A method of desensitizing a holographic recording medium comprising a cured, transparent acrylic polyester polymer containing a soluble α-diketone which is capable of hydrogen atom abstraction and has the formula



wherein R and R′ independently are selected from the group consisting of methyl, branched chain alkyl and cyclic hydrocarbon groups wherein the carbon atoms are part of an aromatic or aliphatic ring and R and R′ together can form part of an aromatic or aliphatic ring and x is an integer of 1 or 2, said α-diketone being present in amounts sufficient to cause a permanent change in the index of refraction of the medium when illuminated by a spacially modulated coherent light beam having a wavelength corresponding to the absorption band wavelength tail of the α-diketone which comprises:

recording one or more holograms in said recording medium and thereafter

exposing the complete recording medium to desensitizing light having a wavelength from about 4,000 to 7,000 angstroms until the medium is inactivated to light.

4,022,619

COMPOSITE DEVELOPER-ETCH COMPOSITION FOR CHROMIUM-PLATED LITHOGRAPHIC PRINTING PLATES

Vincent A. Pagliaro, and Richard G. Walters, both of Racine, Wis., assignors to Printing Developments, Inc., New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,521
Int. Cl.² G03F 7/02; G03C 5/00
U.S. Cl. 96—33 6 Claims

1. A composite developer-etch composition for chromium-plated lithographic printing plates which comprises an aqueous solution of from about 16% to about 22% by weight of aluminum chloride, from about 20% to about 26% by weight of a water-soluble chloride other than aluminum chloride, from about 2.2% to about 4.0% by weight of 85% strength phosphoric acid, from about 0.6% to about 1.4% by weight of acid-stable water-soluble alkali metal or alkali earth metal hypophosphite reducing agent and the balance water; said composition having a specific gravity at 70° F. of from about 1.4 to about 1.5

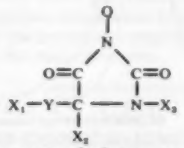
4,022,620

METHOD OF FORMING COLOR PHOTOGRAPHIC IMAGES

Akio Okumura; Atsushi Sugizaki; Seiji Ichijima; Keisuke Shiba, and Kiyoshi Nakazyo, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 3, 1975, Ser. No. 564,977
Claims priority, application Japan, Apr. 3, 1974, 49-37651
Int. Cl.² G03C 7/00, 1/40
U.S. Cl. 96—56.2 35 Claims

1. A method of forming color photographic images which comprises developing an imagewise exposed photographic silver halide emulsion layer with a primary aromatic amino color developing agent in the presence of a yellow color forming coupler represented by the following general formula (I):



(I)

wherein X_1 represents a hydrogen atom, an alkyl group, an aryl group, a 2-tetrahydropyranyl group, a 2-pyridyl group, a 4-pyridyl group or an acyl group having up to about 35 carbon atoms; X_2 represents a hydrogen atom, an alkyl group or an aryl group; X_3 represents a hydrogen atom, an alkyl group, an aryl group or an acyl group having up to about 35 carbon atoms; Y represents an oxygen atom or a sulfur atom; X_2 and X_3 can combine to form a pyrrolidine ring or a piperidine ring; and Q represents a residue of an α-acylacetamide yellow color forming coupler in which one hydrogen atom attached to the active methylene group of the coupler is eliminated.

4,022,621
PHOTOGRAPHIC DEVELOPER COMPOSITION

Katsumi Hayashi, and Yoo Iijima, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

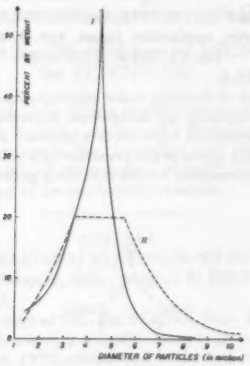
Continuation-in-part of Ser. No. 393,362, Aug. 31, 1973, abandoned. This application Sept. 12, 1975, Ser. No. 612,881
Claims priority, application Japan, Sept. 1, 1972, 47-87704
Int. Cl.² G03C *5/30*
U.S. Cl. 96—66.3 **6 Claims**

5. A process for treating an imagewise exposed silver halide photographic element comprising at least 50 mol% silver chloride comprising developing said element with a developer composition consisting essentially of (1) about 0.05 to 0.5 mol of a hydroquinone compound developing agent per liter of developer solution, (2) about 0.1 to 1.0 mol of an aldehyde-bisulfite or ketone-bisulfite per liter of developer solution, (3) about 0.05 to 1.0 mol of a carbonate per liter of developer solution, (4) about 0.3 mol to less than about 1 mol of a primary or secondary alkanolamine selected from the group consisting of 2-aminoethanol, 1-amino-2-propanol, 2-amino-2-methyl-1-propanol, 2-amino-2-methyl-1,3-propanediol, 2-amino-2-(hydroxymethyl)-1,3-propanediol, 3-amino-1-propanol, 2,2'-iminodiethanol, di-isopropanolamine, 2-isopropylaminoethanol, 2-methylaminoethanol and 2-ethylaminoethanol, per mol of said bisulfite, the alkanolamine being present in a molar amount less than the amount of said bisulfite and (5) a bromide restrainer.

4,022,622
DISPERSING POLYMERIC PARTICLES IN AQUEOUS MEDIUM FOR COATING SILVER HALIDE EMULSION LAYERS

Daniël Maurice Timmerman, Mortsel; Victor Jan Thijs; Walter Frans De Winter, both of Berchem; Frans Henri Claes, and Hubert Vandenabeele, both of Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Division of Ser. No. 408,491, Oct. 23, 1973, Pat. No. 3,941,727. This application Mar. 1, 1976, Ser. No. 662,420
Claims priority, application United Kingdom, Nov. 22, 1972, 53896/72
Int. Cl.² G03C *1/76, 1/78*
U.S. Cl. 96—67 **11 Claims**



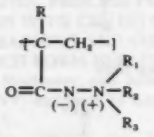
1. Light-sensitive photographic materials comprising a support, a light-sensitive silver halide emulsion layer and a water-permeable protective layer exteriorly to said emulsion layer, said protective layer being formed from a hydrophilic coating composition containing an aqueous binder solution and a homogeneous aqueous dispersion of polymer particles, said dispersion prepared by dissolving a water-insoluble, film-forming polymer in a water-insoluble ethylenically unsaturated monomer which is liquid at room temperature to provide a solution thereof, dispersing by stirring the solution thus formed in an aqueous solution of a hydrophilic colloid and dispersing agent, the stirring being continued until a stable dispersion of polymer-in-monomer solution droplets having a diameter between 1 and 10 micron is formed in said aqueous solution and, while continuously stirring in the presence of a free-radical forming polymerization initiator, heating the dispersion to the decomposition temperature of said polymerization initiator to effect polymerization of said water-insoluble liquid monomer and to form an aqueous dispersion of solvent-free polymer particles, said unsaturated monomer being selected so as to be a solvent at room temperature for said film-forming polymer, and to provide upon said polymerization in the presence of said film-forming polymer, polymer particles having a glass transition temperature of at least 60° C., and said binder of said aqueous binder solution when in an aqueous solution being compatible with said dispersion.

4,022,623
PHOTOSENSITIVE EMULSION CONTAINING POLYVINYL AMINIMIDE POLYMERS

Maurice J. Fitzgerald, Canton; Henry S. Kolesinski, Burlington, and Lloyd D. Taylor, Lexington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 28, 1975, Ser. No. 626,214
Int. Cl.² G03C *1/72*
U.S. Cl. 96—114 **8 Claims**

1. A photosensitive silver halide emulsion containing an emulsion binder wherein the emulsion binder consists essentially of a water-soluble film-forming polyvinyl aminimide polymer havingin its structure repeating units of the formula:



wherein R is hydrogen, alkyl or halogen; R_1 is alkyl; R_2 and R_3 each are alkyl, aryl or alkaryl or R_2 and R_3 may be taken together to form a heterocyclic ring with the nitrogen.

4,022,624
DESENSITIZER COMPOSITION

Akio Miyamoto, and Hiroharu Matsukawa, both of Fujinomiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 419,464, Nov. 27, 1973, abandoned. This application May 14, 1975, Ser. No. 577,368
Claims priority, application Japan, Nov. 29, 1972, 47-119681
Int. Cl.² C08L *1/08*; G03C *5/24, 5/38*
U.S. Cl. 106—2 **16 Claims**

1. A desensitizer composition in combination with an electron accepting developer for desensitizing said developer against coloring a substantially colorless color former wherein said desensitizer composition contains at least one N-(aminoallyl)-lactam chosen from the group consisting of N-(aminoalkyl)-lactam, N-(3-aminopropyl)-β-propiolactam, N-(3-aminopropyl)-γ-butyrolactam, N-(2-methyl-3-aminopropyl)-γ-butyrolactam, N-(3-aminopropyl)-(β-methyl)-γ-butyrolactam, N-(3-aminohexyl)-γ-butyrolactam, N-(4-aminobutyl)-γ-butyrolactam, N-(3-aminopropyl)-ε-valerolactam, N-(2-aminoethyl)-ε-caprolactam, N-(3-aminopropyl)-ε-caprolactam, N-(6-aminohexyl)-ε-caprolactam, N-(3-aminopropyl)-7-caprylactam, or N-(3-aminopropyl)-λλ-laurylolactam.

4,022,625

POLISHING COMPOSITION AND METHOD OF POLISHING

William A. Shelton, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed Dec. 24, 1974, Ser. No. 536,163
Int. Cl.² C09G 1/02
U.S. Cl. 106—3 9 Claims

1. A polishing composition suitable for polishing the surfaces of semi-conductors which comprises an aqueous slurry containing a finely divided calcium-titanium-zirconium-oxygen compound in which the atomic ratio of Ca: Ti: Zr: O is 1:1:3:9, said slurry containing a water-soluble oxidizing agent and having a pH of at least 10.

4,022,626

STRUCTURAL MATERIAL

William C. McBee; Thomas A. Sullivan, both of Boulder City, and Oliver B. Patrick, Henderson, all of Nev., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 22, 1975, Ser. No. 606,803
Int. Cl.² B29C 5/00; C09K 3/28
U.S. Cl. 106—15 FF 4 Claims

1. A process for preparation of a composite structural material comprising compounding the following ingredients: (1) plasticized sulfur prepared by reaction of about 45 to 55 percent elemental sulfur with about 1 to 10 percent of dicyclopentadiene at a temperture of about 120° to 150° C for a period of about 2 hours to 15 minutes, (2) about 8 to 12 percent of asbestos fibers wetted with about 0.5 to 5 percent dipentene and (3) about 25 to 40 percent silica flour; mixing the three ingredients at a temperature of about 120° to 150° C for a period of about 0.5 to 5 minutes; casting the admixture under a pressure of about 500 to 1500 psi and cooling the resultant composite to room temperature.

4. A composite structural material prepared by the process of claim 1.

4,022,627

CRYSTALLIZABLE GLASSES AND NEPHETINE GLASS-CERAMICS CONTAINING ZrO_2 AND ZnO

Megumi Tashiro, Kyoto; Masamichi Wada, Otsu; Toshio Yamanaka, Kyoto, and Kenichi Tani, Otsu, all of Japan, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 18,795, March 16, 1970, abandoned, which is a continuation of Ser. No. 522,069, Jan. 21, 1966, abandoned. This application Apr. 6, 1971, Ser. No. 131,813
Claims priority, application Japan, Jan. 27, 1965, 40-4381
Int. Cl.² C03C 3/22
U.S. Cl. 106—39.6 2 Claims

2. A glass-ceramic containing nepheline crystals formed by thermal crystallization of a glass consisting essentially of in parts by weight 45–57 SiO_2, 29–38 Al_2O_3, 13–22 Na_2O, said parts being based on 100 parts of SiO_2, Al_2O_3 and Na_2O, and for each 100 parts of SiO_2, Al_2O_3 and Na_2O, 0.5–5 parts of ZrO_2 and 1–10 parts of ZnO, wherein said essential SiO_2, Al_2O_3, Na_2O, ZrO_2 and ZnO constituents constitute at least 95 weight percent of the total glass-ceramics, and additionally containing 0–3 parts by weight of TiO_2 for each 100 parts by weight of $SiO_2 + Al_2O_3 + Na_2O$, the total of the weight percent ZrO_2 + the weight percent TiO_2 being at least 3.5, based on the total glass composition.

4,022,628

ION EXCHANGE-STRENGTHENED SILICATE GLASS FILTER FOR ULTRAVIOLET LIGHT

Emil W. Deeg, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Sept. 5, 1975, Ser. No. 610,608
Int. Cl.² C03C 3/30, 3/04, 21/00
U.S. Cl. 106—52 8 Claims

1. An ion exchange-strengthened silicate glass made from a glass making batch in which each 100 parts by weight on an oxide basis consisting essentially of:

about 64 to about 75 parts silicon dioxide, about 5 to about 10 parts potassium oxide, about 4 to about 8 parts sodium oxide, about 4 to about 8 parts calcium oxide, and about 2 to about 10 parts cerium oxide.

whereby upon ion exchanging at a temperature either above or below the strain point of said glass in a bath comprising salts of potassium and silver said glass provides an impact-resistant glass filter for ultraviolet light having a wavelength below about 400 nanometers and wherein said filter is transparent to light having a wavelength about 400 nanometers.

4,022,629

MANUFACTURE OF CEMENT IN ROTARY VESSELS

Hoke M. Garrett, Oakland, and James A. Murray, Walnut Creek, both of Calif., assignors to Kaiser Industries Corporation, Oakland, Calif.

Continuation-in-part of Ser. No. 373,737, June 26, 1973, abandoned. This application Feb. 10, 1976, Ser. No. 656,955
Int. Cl.² C04B 7/02
U.S. Cl. 106—100 24 Claims

1. In a continuous process for the manufacture of cement clinker comprising:

introducing unsintered cement raw materials comprising calcium carbonate containing material, silica containing material and alumina containing material into an inclined rotary vessel comprising a plurality of treatment zones including a calcination zone and a clinkering zone;

heating said raw materials in said calcination zone under conditions of agitation due to the rotation of said vessel at calcination temperatures generally ranging from about 1000° to about 2000° F, said calcination temperatures being below the temperature of insipient fusion of said cement materials to effect thermal decomposition of calcium carbonate with evolution of carbon dioxide;

continuously transferring calcined material from said calcination zone into said clinkering zone;

heating said calcined material in said clinkering zone at sintering temperatures generally ranging from about 2300° to about 2900° F, said sintering temperatures being at or above the temperature of insipient fusion of said cement materials to effect clinkering;

said heating in said rotary vessel being effected at least in part by the combustion of fuel within the gaseous atmosphere of said vessel;

the improvement comprising incorporating into said cement raw materials introduced into said rotary vessel particulate residual fuels having a volatiles content not more than about 40%, an ignition temperature of the non-volatile portion of from about 750° to about 1500° F, and an ash content of less than about 30% to provide from about 5 to about 75% of the heat required for said process in said rotary vessel, said volatiles content and said non-volatiles ignition temperature of said residual fuels being such that the principal oxidation of said residual fuels occurs in the calcination zone.

4,022,630

PORTLAND CEMENT-MAKING AND MUNICIPAL REFUSE CONVERSION

David Watson, Longfield, and Peter Hood, Nottingham, both of England, assignors to The Associated Portland Cement Manufacturers Limited, London, England

Continuation of Ser. No. 382,167, July 24, 1973, abandoned. This application Feb. 9, 1976, Ser. No. 656,574
Claims priority, application United Kingdom, July 27, 1972, 35283/72
Int. Cl.² C04B 7/02
U.S. Cl. 106—103 3 Claims

1. The method of making Portland cement clinker of se-

lected final quality while also disposing of municipal refuse, which comprises the steps of:

a. providing comminuted municipal refuse to obtain particulate municipal refuse capable of being blown into a kiln in air-borne fashion and which will produce an ash when burned at a temperature in the order of 1800° C;
b. preparing a Portland cement raw feed mix capable of accommodating said ash during clinkering into Portland cement to avoid any detriment to said final cement quality;
c. introducing said raw feed mix into a conventional rotary cement kiln;
d. firing said conventional kiln by blowing in conventional rotary cement kiln fuel and said particulate municipal refuse of step (c) into the kiln along with combustion air;
e. controlling the relative proportions of the conventional fuel and the particulate municipal refuse of step (d) to obtain Portland cement clinker without any detriment to final cement quality as defined in step (b); and
f. recovering Portland cement clinker of said selected final quality from said kiln.

4,022,631

PROCESS FOR PRODUCING REGENERATED CELLULOSIC ARTICLES

Albin F. Turbak, Convent Station; Richard B. Hammer, Morris Plains; Norman A. Portnoy, Hopatcong, and Richard E. Davies, Ridgewood, all of N.J., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed May 19, 1975, Ser. No. 578,934
Int. Cl.² C08L *1/24*
U.S. Cl. 106—168 **14 Claims**

1. A process for producing a regenerated cellulosic article from a cellulosic solution formed by the addition of cellulosic material to dimethyl sulfoxide and an aldehyde selected from the group consisting of formaldehyde and a paraformaldehyde comprising contacting said cellulosic solution with a regeneration medium comprising an aqueous solution having a pH greater than 7 of from 0.25% to the maximum solubility of the compound in water of a water soluble nucleophilic compound selected from the group consisting of ammonia, ammonium salts, saturated amines and salts of sulfur compounds in which the sulfur has a valence of less than 6.

4,022,632

DECREASING THE PHOTOSENSITIVITY OF TITANIUM IV DIOXIDE

Gordon C. Newland; Gether Irick, Jr., and Thomas H. Larkins, Jr., all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 2, 1976, Ser. No. 702,162
Int. Cl.² C08L *1/12;* **C09C** *1/36*
U.S. Cl. 106—193 J **5 Claims**

1. Titanium dioxide pigment having coated thereon a salt of the formula $(R\text{-}CO_2)_2Me$ where Me is Ce^{+2}, Mn^{+2} or Co^{+2} and R is a linear or branched alkyl group having from 1 to 12 carbons, at a concentration to give from about 0.1% to about 20.0% by weight of the metal based on the weight of the pigment.

4,022,633

METHOD OF STABILIZING SOILS

Gordon L. Schneider, P.O. Box 414, Clovis, Calif. 93612

Division of Ser. No. 470,805, May 17, 1974, Pat. No. 3,950,179. This application Dec. 12, 1975, Ser. No. 640,256
Int. Cl.² C08L *3/00, 3/02*
U.S. Cl. 106—208 **21 Claims**

1. A method of stabilizing soil comprising adding a stabilizing composition to a soil at a concentration of about 5–25 gallons of the composition per 1000 gallons of water per 6 inch lift, the composition comprising a hydratable gum in an amount effective in providing positive bonding between granular particles, water, and a monohydric alcohol having 1–4 carbon atoms in an amount of at least 25% by volume based upon the volume of alcohol and water in the composition.

4,022,634

AMMONIA-CONTAINING SIZING COMPOSITIONS

Ralph Waldo Emerson, Boston, Mass., and John R. Shattuck, Cumberland Foreside, Maine, assignors to The Plasmine Corporation, Portland, Maine

Continuation-in-part of Ser. No. 542,943, Jan. 22, 1975, abandoned, which is a continuation of Ser. No. 436,917, Jan. 28, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 565,810
Int. Cl.² C08L *93/04*
U.S. Cl. 106—218 **59 Claims**

1. A sizing composition which comprises sizing effective amounts of a rosin that is modified with from about 5 to 50 percent, based on the weight of the rosin, of an organic acidic compound selected from the group consisting of an α, β-unsaturated aliphatic acid containing from about 3 to 6 carbon atoms, an anhydride thereof, and their mixtures; ammonia in amounts sufficient to enhance the sizing characteristics of the composition; ammonium salt effective to, and in amounts sufficient to, enhance the sizing characteristics of the composition; and containing amounts of the modified rosin, ammonia and ammonium salt sufficient to provide the composition with a total acidity of at least about 1,000 parts per million.

4,022,635

MODIFIED ASPHALTITE POTTING COMPOSITION

Mason H. Earing, Danville, Ill., assignor to General Electric Company, Carmel, Ind.

Filed Sept. 17, 1975, Ser. No. 614,320
Int. Cl.² C08K *3/36;* **C08L** *95/00;* **H01B** *3/10, 3/26*
U.S. Cl. 106—280 **6 Claims**

1. A potting compound comprising:
a modified asphaltite composition having a softening point of from 90° C to 125° C, a penetration at 25° C with a 100 gram mass after 5 seconds of from 0 – 5 mm, and a rheological value as measured at 200° C on a Stormer Viscosimeter using a 400 gram mass of from 10 – 100 seconds for 100 revolutions; and
electrically insulating and thermally conducting filler material substantially inert to the modified asphaltite composition and having a size of from 20 – 325 mesh to the extent of from 45 – 80% by weight of the asphaltite-filler mixture.

4,022,636

TITANIUM DIOXIDE PIGMENT AND PROCESS FOR MAKING SAME

Edward Conley Murray, Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

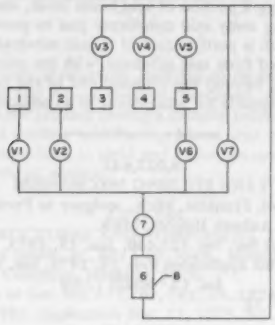
Filed Mar. 29, 1976, Ser. No. 671,430
Int. Cl.² C09C *1/36*
U.S. Cl. 106—300 **11 Claims**

1. A coated titanium dioxide pigment, comprising:
a titanium dioxide pigment;
a first coating of predominantly amorphous alumina on the titanium dioxide pigment; and
a second coating of predominantly boehmite alumina on the titanium dioxide pigment and over the first coating.

4,022,637
METHOD FOR SEPARATION OF WATER SOLUBLE CARBOHYDRATES

Robert F. Sutthoff, Clinton, and William J. Nelson, Camanche, both of Iowa, assignors to Standard Brands Incorporated, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,288
Int. Cl.² C07G *3/00*; C13K *1/00*, *11/00*
U.S. Cl. 127—46 A **9 Claims**



1. A method for the separation of water soluble carbohydrates from a feed solution by the utilization of a fractionation medium wherein the solution contains carbohydrates A and B in major amounts and carbohydrate A has a volume distribution coefficient of at least 0.05 units greater than carbohydrate B when determined on said medium comprising:

I. Sequentially admitting predetermined volumes of the feed solution and elution water to a column of said medium;

II. Separating the effluent from the column sequentially into the following fractions:

a. carbohydrate A rich fraction,

b. carbohydrate A rich fraction highly contaminated with carbohydrate B,

c. carbohydrate B rich fraction highly contaminated with carbohydrate A,

d. carbohydrate B rich fraction, and

e. dilute carbohydrate B rich fraction,

III. Admitting sequentially into the column:

a. carbohydrate A rich fraction highly contaminated with carbohydrate B,

b. a volume of feed solution approximately equal to carbohydrate B rich fraction,

c. carbohydrate B rich fraction highly contaminated with carbohydrate A,

d. dilute carbohydrate B rich fraction,

e. a volume of elution water approximately equal to the volume of the carbohydrate A rich frction, the carbohydrate A rich fraction highly contaminated with carbohydrate B and the dilute carbohydrate B rich fraction being recycled directly to the column and the carbohydrate B rich fraction highly contaminated with carbohydrate A being collected while the feed solution is introduced into the column and then admitting said collected fraction into the column, and

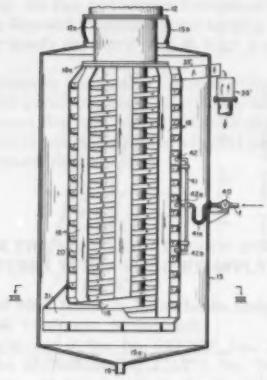
IV. Repeating steps II and III in a cyclic manner.

4,022,638
CONTINUOUS RECOVERY OF BASE METAL FROM INSULATED WIRE SCRAP

James H. Weet, Mars, Pa., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 5, 1975, Ser. No. 602,111
Int. Cl.² B08B *3/08*, *3/10*
U.S. Cl. 134—1 **27 Claims**

1. In a process for recovering a base metal such as copper or aluminum from metal wire having a coating of another metal such as tin, lead or an alloy thereof and a resin covering, first shredding the wire into an aggregate containing free resin material and relatively short-length metal bits of not greater than about 0.375 of an inch in length and within a range of about 0.0048 up to about 0.25 of an inch in diameter, preliminarily removing the free resin material from the aggregate to reduce its content to not more than about 2% by volume, thereafter advancing the aggregate in the form of an active



bed of substantially uniform thickness along an upward helical path under vibratory action while applying an aqueous chemical solution thereto in a counterflow path with respect to and downwardly through the active bed and while reacting the solution with and removing the coating metal from the base metal of the bits, and the solution having a chemical content that is effectively reactive with the coating metal and that is of minimized reactiveness with respect to the base metal of the bits.

4,022,639
METHOD FOR REMOVING CARBON SCALE

Hiroshi Ueki, Yokohama, Japan, assignor to Kurita Water Industries Ltd., Osaka, Japan

Filed July 10, 1975, Ser. No. 594,760
Claims priority, application Japan, July 24, 1974, 49-85383; Aug. 30, 1974, 49-99608
Int. Cl.² B08B *3/10*, *7/04*, *9/06*
U.S. Cl. 134—2 **12 Claims**

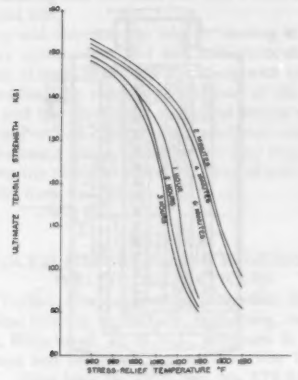
1. A method for removing adherent carbon-containing scale from an object, which consists essentially of the steps of: contacting said scale with a 0.1 to 20 weight percent aqueous solution of a substance selected from the group consisting of ammonium carbamate and sodium, potassium, silver, ammonium and amine carbonates and bicarbonates, for a first period of time effective to permeate said solution into said scale; then removing the remaining solution from contact with said scale; then heating the scale to a temperature in the range of from 200° to 500° C and simultaneously circulating past said scale and in contact therewith a stream of air or gaseous oxygen, for a second period of time effective to oxidize the carbon in said scale and to transform it to a gas so that it is removed from said object.

4,022,640

PROCESS FOR COLD-WORKING AND STRESS-RELIEVING NON-HEAT HARDENABLE FERRITIC STAINLESS STEELS

Harry Tanczyn, Baltimore, Md., assignor to Armco Steel Corporation, Middletown, Ohio

Division of Ser. No. 434,397, Jan. 18, 1974, Pat. No. 3,888,119. This application Mar. 26, 1975, Ser. No. 562,123
Int. Cl.² C22C *38/40*
U.S. Cl. 148—37 **4 Claims**



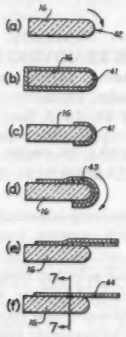
1. Cold worked and stress-relieved bar, rod and wire, having ultimate tensile strengths ranging from about 125 to about 300 ksi and a percent elongation (sample length 4 times diameter) of not less than 15%, formed by cold reducing at least 50% in thickness and stress-relieving a non-heat hardenable ferritic stainless steel consisting essentially of, by weight percent, from about 11 to about 30% chromium, up to about 0.1% carbon, up to about 1% manganese, and balance iron.

4,022,641

METHOD FOR MAKING BEAM LEADS FOR CERAMIC SUBSTRATES

Frank A. Lindberg, Catonsville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 2, 1976, Ser. No. 673,339
Int. Cl.² C23F *1/02*
U.S. Cl. 156—650 **4 Claims**



1. A process for making beam leads for use in interconnecting adjacent substrates and electronic components thereon comprising the steps of,

first rounding at least one end of a substrate in its depth dimension,

then rotating said substrate end over end and depositing on said substrate during rotation, a metal having poor adhesion thereto whereby metal is deposited onto the top, bottom and sides of said substrate,

then etching said metal to form at least one temporary pad having a portion of the top side of said substrate and a portion on the rounded end of said substrate,

then depositing a second metal onto said substrate and over said at least one temporary pad to form a plurality of spaced beam leads,

then lifting said temporary pad from said substrate thereby also raising a portion of said beam leads, and

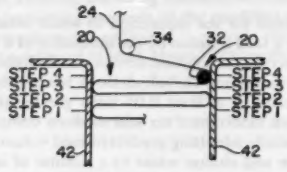
then etching away said temporary pad to provide a beam lead which is partly attached to said substrate and partly unattached from said substrate, with the unattached part extending beyond the rounded end of the substrate and being adaptable for attachment to an adjacent substrate.

4,022,642

YARN FOLDING MECHANISM

Martin L. Abel, Franklin, Mich., assignor to Permalock Company, Inc., Auburn Heights, Mich.

Division of Ser. No. 323,440, Jan. 15, 1973, Pat. No. 3,915,789. This application Feb. 18, 1975, Ser. No. 550,633
Int. Cl.² B04H *11/04*
U.S. Cl. 156—72 **26 Claims**



1. A method for engaging and folding a plurality of strands of flexible material into a plurality of series of loops between first and second opposing surfaces, comprising the steps of:

a. moving a first elongated member to engage said strands and move them against the first surface;

b. moving the first elongated member out of the area of the loop that will be formed when the second elongated member moves the strands against the second surface;

c. creating slack in said strands;

d. moving the second elongated member to move the strands against the second surface to form a loop;

e. moving the second elongated member out of the area of the loop that will be formed when the first elongated member moves the strands against the first surface;

f. creating slack in said strands;

g. moving the first elongated member to move the strands against the first surface to form a loop and

h. for steps (a), (b), (d), (e) and (g), rotating said elongated members at the ends thereof and translating the rotational movement into non-rotational movement in the portion of the elongated members that engage the strands along at least a portion of the movement of the elongated members.

4,022,643

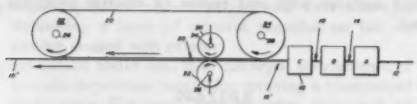
METHODS OF MANUFACTURING EMBOSSED RESINOUS PRODUCTS

James R. Clark, Edison, N.J., assignor to Congoleum Corporation, Milwaukee, Wis.

Filed Dec. 24, 1975, Ser. No. 644,371
Int. Cl.² B32B *5/18*
U.S. Cl. 156—78 **11 Claims**

1. A method of manufacturing an embossed resinous product having a textured surface which comprises: forming a potentially foamable resinous composition containing a blowing agent therein; heating said potentially foamable resinous

composition for a sufficient period of time at an elevated temperature to activate said blowing agent to cause blowing of said potentially foamable resinous composition; and then, before the freshly blown resinous composition has cooled to ambient temperature and while it is still relatively soft, mechanically embossing said freshly blown resinous composition



under sufficient pressure by applying to its surface a previously heated and blown, finished, hardened, chemically embossed resinous product having a suitably textured embossing surface; and cooling said freshly blown and now embossed resinous composition to yield and embossed resinous product having a textured surface.

4,022,644

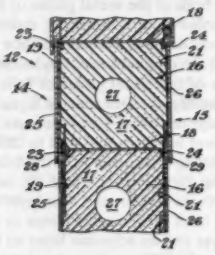
FOAM STRUCTURES AND COMPONENT THEREFORE

Hubert Stacy Smith, Jr., Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 517,701, Oct. 24, 1974, Pat. No. 3,978,255. This application Dec. 17, 1975, Ser. No. 641,406

Int. Cl.² B32B *5/20*

U.S. Cl. 156—79 **5 Claims**



1. In a method for the preparation of a structure by the successive deposition of a plurality of strips of foam, the foam being obtained from a foamable hardenable liquid composition deposited on a previously deposited strip of foam, the improvement whch comprises providing

a reinforcement member which can be folded and rolled and is particularly suited for the preparation of structures by the spiral generation technique, the reinforcememt member comprises in cooperative combination,

a first skin member,

a second skin member,

a transverse member and

at least first and second foraminous sheet members, the first skin member and first sheet member being in generally overlapping face-to-face relationship, the second skin member and second sheet member being in generally face-to-face overlapping relationship,

the transverse member having

a first edge portion and

a second edge portion, the first edge portion being affixed to the first sheet member, the second edge portion being affixed to the second sheet member, the first skin member being affixed to the first sheet member at a location generally about the location of attachment of the first edge of the transverse member to the first sheet member, the second skin member being affixed to the second sheet member in a region generally adjacent the region of attachment of the second edge of the transverse member to the second sheet member, the first and second sheet members projecting beyond the adjacent portions of the first and second skin members at a location generally adjacent the location of attachment to the first skin member and first sheet member and second skin member and second sheet member respectively, with the further limitation that the skin members will prevent contact of a foaming material contained thereby with application apparatus and the reinforcement can be folded and rolled, disposing at least a portion of the first and second skin members in generally opposed parallel relationship, disposing an adjacent portion of the first and second foraminous sheet members in generally opposed parallel relationship, the first and second foraminous sheet members being disposed in generally overlapping relationship with a previously deposited strip to form a closed channel,

depositing foamable hardenable material within the closed channel and permitting said foamable hardenable material to contact first and second foraminous sheet members, the transverse members and adjacent portions of the first and second skin members.

4,022,645

PROCESS FOR THE VULCANIZATION OF INNERTUBES, AND INNERTUBES VULCANIZED BY APPLYING SAID PROCESS

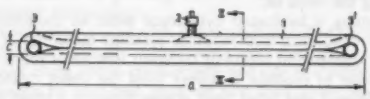
Cornelis Geerlof Bins, Heelsum, Netherlands, assignor to N.V. Rubberfabriek Vredestein, Netherlands

Continuation-in-part of Ser. No. 327,490, Jan. 29, 1973, abandoned. This application July 3, 1975, Ser. No. 592,986

Claims priority, application Netherlands, Feb. 2, 1972, 7201338

Int. Cl.² B29H *5/01*

U.S. Cl. 156—120 **2 Claims**



1. In a process for the open vulcanization of innertubes, the improvement which comprises extruding a rubbery vulcanizable composition in the form of a tube, cutting the resulting extrudate to length, installing a valve stem and valve in said length, splicing the ends of said length to form an endless unvulcanized innertube, injecting, through said valve into said innertube, a gaseous medium amounting to a volume from about 7.5 to about 12.5% of the nominal inflated volume of the intended innertube, folding the innertube to form two superposed substantially horizontal lengths of the endless innertube interconnected by substantially vertically extending end folds at their opposite ends, and arranging the thus folded innertube, with the superposed lengths one above the other, on a supporting surface, inserting a respective rod, having a diameter of from about 13 to about 25 mm, transversely through each of said vertically extending end folds, and then open vulcanizing the thus arranged innertube at a temperature from about 150° to about 190° C.

4,022,646

PROCESS FOR THE MANUFACTURE OF CO-ORIENTED LAMINATED ETHYLENE POLYMER FILMS

Kenneth Casey, North Bay, Canada, assignor to Du Pont of Canada Limited, Montreal, Canada

Continuation of Ser. No. 202,557, Nov. 26, 1971, abandoned. This application Feb. 25, 1974, Ser. No. 445,609

Int. Cl.² B32B *31/08*

U.S. Cl. 156—164 **9 Claims**

1. A process for the manufacture of a co-orientation laminated ethylene polymer film laminate from separate films comprising the steps (1) bringing together in face to face

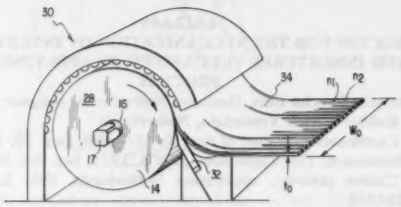
engagement at least one ethylene polymer film (A) of a density in the range of about 0.950 to about 0.960 with at least one separate ethylene polymer film (B) of a density in the range of about 0.910 to about 0.945, the polymer of film (A) being of a higher melting point than the polymer of film (B), and (2) essentially simultaneously orienting and laminating said engaged films at a temperature below the melting point of the polymer of film (A) by means of contact with a first roll and subsequently with a second roll, the temperature of the first roll being higher than the temperature of the second roll, with film (A) being in contact with said first roll.

4,022,647

METHOD OF MAKING COHERENT OPTICAL FIBER BUNDLES AND FACE PLATES

George J. Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.

Filed Dec. 17, 1974, Ser. No. 533,659
Int. Cl.² B32B *31/00*
U.S. Cl. 156—182 **4 Claims**



1. A method of making a plurality of coherent optical fibers, including the steps of,

a. forming a laminated cylindrical billet of modular disc elements, each said modular element including at least two transparent layers of different indices of refraction,

b. skiving to produce a veneer from the outer cylindrical surface of said billet, said veneer defining a sheet of the skiving depth and having a longitudinal axis orthogonal to the long axis of the billet and having longitudinally running laminae of alternately different indices of refraction,

c. coating at least one surface of said veneer with a transparent sheet having an index of refraction less than the higher index layer of said veneer, and

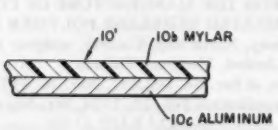
d. wrapping said now coated veneer around an axis orthogonal to its longitudinal axis to thereby form a second billet.

4,022,648

BONDING OF ORGANIC THERMOPLASTIC MATERIALS

Paul T. Woodberry, Reading, Mass., and Donald G. Wilson, Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 278,321, Aug. 7, 1972, abandoned, which is a continuation of Ser. No. 94,813, Dec. 3, 1970, abandoned, which is a continuation-in-part of Ser. No. 638,123, May 12, 1967, abandoned. This application Feb. 7, 1975, Ser. No. 548,054
Int. Cl.² B29C *19/04*
U.S. Cl. 156—273 **21 Claims**



1. A method of bonding an organic thermoplastic dielectric material to a substrate, comprising the steps of juxtapositioning surfaces to be bonded of said material and said substrate, applying sufficient heat to said material to cause softening thereof, employing a source of electric potential to established a region of electric potential between two electrodes wherein said region of electric potential further comprises an electric field, applying said region of electric potential to said juxtaposed surfaces for a time sufficient to draw said surfaces together to form a bond therebetween, and cooling said bonded surfaces with said region of electric potential removed.

4,022,649

METHOD FOR PRODUCING METAL LAMINATES CONTAINING AN INTERLAYER OF THERMALLY STABLE HETEROCYCLIC POLYMER

Keisuke Nakagome, and Toshiharu Suzuki, both of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Continuation of Ser. No. 353,821, April 23, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,982
Claims priority, application Japan, Apr. 21, 1972, 47-40689
Int. Cl.² C09J *5/06*
U.S. Cl. 156—309 **5 Claims**

1. A method for producing a metal laminate having high thermal stability and consisting of mutually insulated metal plates or foils with an interlayer of thermally stable polymer film comprising the steps of:

A. forming at least one film layer having a substantially small volatile content of at most 3% by weight on a surface of one or both of the metal plates or foils, by coating and drying a solution of a thermally stable polymer containing heterocyclic rings on said surface or surfaces;

B. forming at least one adhesive layer on a non-coated surface of one of the metal plates or foils and/or on said at least one film layer, said adhesive layer having a thickness of one-third or less of said film layer and containing a volatile content in an amount of 4 to 20% by weight, by coating and drying a solution of a thermally stable polymer containing heterocyclic rings on said non-coated surface or surfaces and/or said film layer or layers;

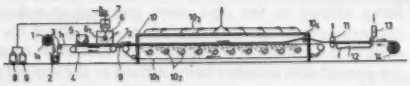
C. heat-bonding both of the metal plates or foils through at least a film layer and an adhesive layer so that the volatile content uniformly diffuses throughout the bonding interlayer and is confined therein, which is formed of said at least one film layer and said at least one adhesive layer, and is less than 5% by weight.

4,022,650

APPARATUS FOR PRODUCING A DECORATIVE BUILDING MATERIAL

Constantin Gurgui; Vasile Luca; Andrei Eckardt, and Paraschiv Ciulacu, all of Bucharest, Romania, assignors to Intreprinderea "Bucuresti" Pentru Extragerea, Prelucrarea si Montarea Marmurei si Pietrei de Constructii, Bucharest, Romania

Division of Ser. No. 221,467, Jan. 27, 1972, Pat. No. 3,930,088, which is a division of Ser. No. 791,405, Jan. 15, 1969, Pat. No. 3,705,830. This application Aug. 25, 1975, Ser. No. 607,608
Claims priority, application Romania, Jan. 24, 1968, 55669
Int. Cl.² B32B *31/12, 31/14, 35/00*
U.S. Cl. 156—498 **3 Claims**



1. An apparatus for producing a decorative structural material of the type in which a layer of granules is bonded to one

side of a net web and is coated with a transparent synthetic resin covering, said apparatus comprising:

coating means for continuously applying to a web of netting a synthetic-resin primer;

a first conveyor adjacent said coating means for displacing the web of netting coated with said primer away from said coating means;

granule-deposition means above said first conveyor for depositing a layer of mineral granules on the web of netting coated with primer;

spray means above said first conveyor downstream of said granule-deposition means for spraying a transparent synthetic-resin film onto said granules deposited on the primed web of netting;

an elongated heating tunnel downstream of said first conveyor and a second conveyor extending through said tunnel for conveying the web of netting carrying said granules and coated with said film therethrough, said tunnel being provided below said second conveyor with an array of heating elements for drying the web coated with said granules and said film and heating same to a temperature of substantially 80°to 120° C;

a roller for deflecting said web away from said conveyor at a discharge end of said tunnel;

a pair of compaction rolls downstream of said heating tunnel for pressing the film-coated granules compacted together and into said web to form a foil therefrom; and

means downstream of said rolls for cooling the resulting foil.

4,022,651

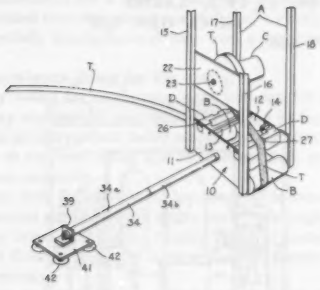
APPARATUS FOR LAYING PRESSURE SENSITIVE TAPE FROM A TAPE ROLL

Frank D. Larkins, P.O. Box 6103B, Greenville, S.C. 29606, and Bruce D. Anderson, 103 Indian Spring Drive, Greenville, S.C. 29607

Filed Jan. 19, 1976, Ser. No. 650,257

Int. Cl.² B44C *7/00;* **B43L** *9/00*

U.S. Cl. 156—577 **1 Claim**



1. For use in apparatus for laying pressure sensitive tape from a roll for marking basketball courts and the like having a vertical frame, a pair of transverse pressure roll carried by said frame supporting said frame for rolling movement thereon, transverse tape roll supporting means carried within said frame and a transverse guide bar having a guide slot therein carried within said frame above said transverse pressure roll for receiving and guiding said tape in said slot as it is fed from a tape roll carried by said supporting means, and thence beneath said pressure roll, the improvement comprising: a rigid extension bar, means connecting said extension bar rigidly to said frame transversely thereof, (and) means pivotally connecting said extension bar with respect to the surface being marked remote from said frame including a base attaching means removeable fastening the base to the surface to be marked, a vertical free standing pin fixed to said base and connecting means pivotally carried by said pin and removeable attached to said extension bar remote from said frame.

4,022,652

METHOD OF GROWING MULTIPLE MONOCRYSTALLINE LAYERS

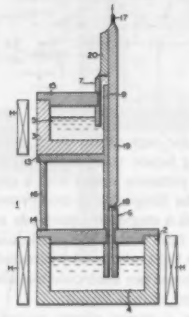
Hitoshi Hirano, Kanagawa, and Tsuguo Fukuda, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 9, 1975, Ser. No. 611,838

Claims priority, application Japan, Sept. 26, 1974, 49-110026

Int. Cl.² B01J *17/18, 17/34, 17/36;* **C01G** *35/00*

U.S. Cl. 156—605 **12 Claims**



1. A method of growing multiple monocrystalline layers from melts, comprising:

A. contacting a seed with a first melt in a first crucible;

B. Slowly vertically withdrawing said seed from said first melt along and in contact with one side of a vertical guide means to cool and grow on said seed along said guide means a first monocrystalline layer comprised of an uncooled zone located near said first melt and a cooled zone located spaced from said first melt and formed upon cooling;

C. successively supplying a second melt in a second crucible from a prescribed point to the cooled zone of said first monocrystalline layer as successively grown, said supplying of said second melt comprising the steps of:

a. disposing in said second melt a liquid column forming member comprising said guide means having an upper end, a frame unit havng a projected portion extending beyond the upper end of said guide means and a first space between the other side of said guide means and said frame unit, said first space being capillary and extending from within said second melt up to the upper end of said guide means;

b. permitting said second melt to rise through said first space up to the upper end of said guide means to form a liquid column of said second melt within said first space;

c. withdrawing said first monocrystalline layer along said one side of said guide means beyond the upper end of said guide means thereby forming a second capillary space between the projected portion of said frame unit and the cooled zone of said first monocrystalline layer; and

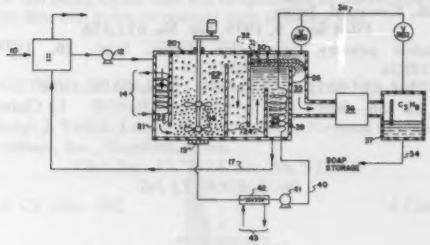
d. permitting said liquid column of said second melt to rise through said second space so that said second melt contacts said cooled zone of said first monocrystalline layer; and

D. permitting a second monocrystalline layer to be grown on the cooled zone of said first monocrystalline layer by solidification of a portion of said second melt contacted with the cooled zone of said first monocrystalline layer.

4,022,653
PROCESS FOR SEPARATING SOAP FROM BLACK LIQUOR

Hong H. Lee, Gainesville, Fla., assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,396
Int. Cl.² D21C 11/00
U.S. Cl. 162—16 6 Claims



1. A process for separating soap compounds from spent cellulosic pulping liquor comprising the steps of:

A. Charging a pressure vessel with a quantity of said liquor;

B. Adjusting the temperature and pressure of said liquor to coincide with a respective pressure and temperature of a point which falls within the gas/liquid range of the phase diagram of a light, aliphatic hydrocarbon having less than 20 carbon atoms per molecule but above a corresponding freezing point of said liquor;

C. Percolating a vapor phase quantity of said aliphatic hydrocarbon through said liquor quantity;

D. Agitating said quantity of liquor substantially simultaneously with said percolation;

E. Quiescing said percolated quantity of liquor for gravimetric separation of said hydrocarbon and coagulated soap therefrom into respective strata above the surface of said liquor quantity;

F. Collectively separating soap and liquid hydrocarbon strata from the surface of said liquor quantity;

G. Adjusting the temperature and pressure of said separated soap and liquid hydrocarbon to within the vaporization range of said hydrocarbon; and

H. Venting vaporized hydrocarbon from the presence of said soap.

4,022,654
COUNTERCURRENTLY BLEACHING HIGH CONSISTENCY CELLULOSE PULP WITH OXYGEN

Hans-Erik Rye Engstrom, and Bengt Edvard Pettersson, both of Sundsvall, Sweden, assignors to Sunds Aktiebolag, Sundsvall, Sweden

Continuation of Ser. No. 414,341, Nov. 9, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,285
Claims priority, application Sweden, July 24, 1970, 10238/70; Feb. 17, 1971, 2023/71
Int. Cl.² D21C 9/10
U.S. Cl. 162—19 3 Claims

1. A continuous method for countercurrently bleaching high consistency cellulose pulp with oxygen, which comprises

introducing the pulp in disintegrated and fluffed condition into a space at the top of a substantially internally smooth pressurized reaction tower;

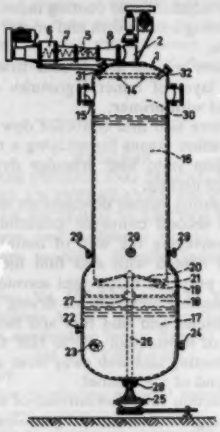
introducing oxygen into the lower portion of said tower;

maintaining a gas-permeable column of finely disintegrated and fluffy pulp at a consistency of 25–35% by weight below the space at the top of the tower, which space contains oxygen;

bleeding gas from the space at the top of the tower to avoid enrichment of the space with gas unable to react with the pulp;

establishing and maintaining a reaction temperature of 80°–120° C. for the contents of the tower;

maintaining a maximum height, measured in meters, of five



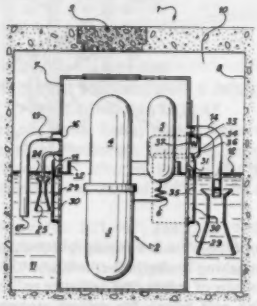
tenths of the maintained pulp consistency, measured in percent, of said column of finely disintegrated and fluffy pulp of high consistency; and

discharging bleached pulp from the bottom of the tower.

4,022,655
DEVICE FOR LIMITING ACCIDENTAL PRESSURE OVERLOADS IN A NUCLEAR REACTOR CONFINEMENT STRUCTURE

Nicolas Gaouditz, Manosque; Edouard Le Borgne, and Robert Mogavero, both of Aix-en-Provence, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 3, 1974, Ser. No. 529,095
Claims priority, application France, Dec. 12, 1973, 73.44391; Dec. 12, 1973, 73.44392
Int. Cl.² G21C 9/00
U.S. Cl. 176—38 4 Claims



1. A device for limiting accidental pressure overloads in a confinement structure of a nuclear reactor, comprising a first thin-walled enclosure which contains the reactor, a refrigerant circuit for cooling the reactor core in said first enclosure, said first enclosure being surrounded by a second high-strength enclosure having thick walls, an intermediate space defined between said enclosure partly filled with a volume of refrigerant in the liquid state, an air cushion above said volume in said space, means for communication between said enclosures including bubbling ducts opening at one end of the wall of said

first enclosure above the level of the volume of refrigerant in the liquid state within said intermediate space and opening at the other end beneath said liquid level, each of said ducts having an internal partition system at the lower part of said other end extending in a direction parallel to the axis of the duct to separate the flow of gas within said duct and to break-up bubbles produced within the volume of refrigerant, said partition system of each of said ducts extending to a greater depth of immersion in said volume than that of said duct itself and defining a plurality of parallel channels distributed over the cross-section of said duct, the depth of immersion in said volume of the extremities of said channels being of progressively decreasing value from the center to the periphery of said cross-section.

4,022,656

SUSPENDED NUCLEAR REACTOR CONTAINMENTS WITH REDUCED THERMAL STRESS

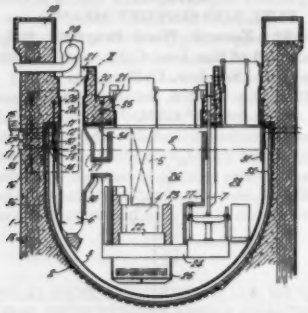
John Graham Durston, Northwich, and John Richard Hind, Warrington, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Aug. 20, 1974, Ser. No. 498,919

Claims priority, application United Kingdom, Sept. 28, 1973, 45543/73

Int. Cl.² G21C *9/00*

U.S. Cl. 176—38 **3 Claims**



1. A containment for a nuclear reactor comprising:

a pre-stressed concrete structure, defining a cavity having a substantially hemispherical base and a horizontal plane roof,

a steel membrane lining for the cavity,

a primary vessel for containing a nuclear reactor core and ancillary equipment generally submerged in liquid coolant, the primary vessel being suspended by attachment at its rim to the roof lining and to steel anchors in the roof structure concrete,

an annular tank for containing liquid metal in contact with the external surface of the upper peripheral region of the primary vessel and having cooling coils for passing a first coolant fluid through the tank in heat exchange with the liquid metal,

thermal insulation of varying thickness disposed about the primary vessel below the annular tank, the thermal insulation reducing in thickness towards the rim of the primary vessel, and a jacket embracing the thermal insulation, the jacket having inlet and outlet connections for a second coolant fluid.

4,022,657

DEVICE FOR THE THERMAL PROTECTION OF A FAST REACTOR VESSEL

Guy Lemercier, Le Puy Ste-Reparade, France, assignor to Commissariat a l'Energie Atomique, Paris, France

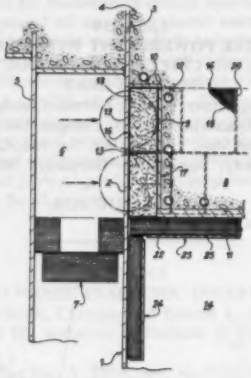
Filed July 10, 1975, Ser. No. 594,644

Claims priority, application France, Aug. 30, 1974, 74.29651

Int. Cl.² G21C *11/08*

U.S. Cl. 176—40 **8 Claims**

1. A device for the thermal protection of the top portion of a fast reactor vessel from a heated neutral gas therein said vessel having a lateral cylindrical vessel wall, an oppositely-placed shell from said wall forming part of a horizontal top shield structure which closes the reactor vessel, an annular space between said wall and said shell said vessel being embedded in said shield structure and suspended from the end portion of the vessel wall at a bond strake, comprising at least



one ring fitted and compressed within said annular space between said shield slab shell and said opposite reactor vessel wall, said ring including a plurality of elements in adjacent relation at the periphery of said shield slab, said elements forming a plurality of rings extending in horizontal planes and superposed vertically within the annular space.

4,022,658

THERMAL SHIELD SYSTEM FOR THE PRIMARY VESSEL SUSPENSION STRAKE OF A FAST REACTOR

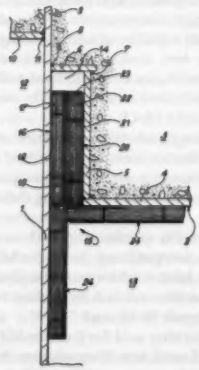
Jean-Michel Gama, Orsay, and Jean-Pierre Kung, Le Plessis Robinson, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed July 14, 1975, Ser. No. 595,483

Claims priority, application France, Aug. 30, 1974, 74.29652

Int. Cl.² G21C *15/04*

U.S. Cl. 176—40 **3 Claims**



1. A thermal shield system for a primary vessel suspension strake of a fast reactor in which said suspension strake defines

an annular space with a lateral cylindrical shell surrounding a concrete slab which closes an upper extremity of the primary vessel and from which said vessel is suspended, said annular space communicating with an atmosphere of neutral gas contained within the vessel beneath a base plate which extends beneath the concrete slab, comprising a heat-insulating structure within said annular space between said vessel suspension strake and said cylindrical shell of said top closure slab, means for fixing said heat-insulating structure against said primary vessel wall and against said cylindrical shell.

4,022,659

NUCLEAR POWERPLANT WITH CLOSED GAS-COOLING CIRCUIT FOR PRODUCTION OF PROCESS HEAT

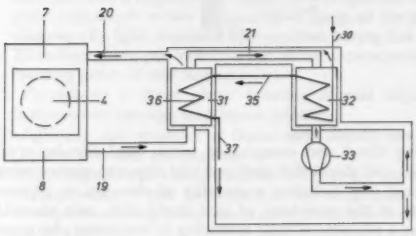
Heinrich Baumgaertner, Ketsch, Germany, assignor to Hochtemperatur-Reactorbau GmbH, Cologne, Germany

Filed Mar. 7, 1975, Ser. No. 556,425

Claims priority, application Germany, Mar. 8, 1974, 2411039

Int. Cl.² G21C *3/56*

U.S. Cl. 176—60 **23 Claims**



1. A powerplant having a closed gas-cooling circuit for the production of process heat at high temperatures on the order of at least about 850° C., which process heat is to be transferred to a secondary working fluid circuit by means of heat exchange techniques, said powerplant comprising:

a. a vessel comprising a generally solid block of material;

b. a high-temperature nuclear reactor positioned within said vessel;

c. a plurality of heat exchanger units positioned about said reactor in said vessel, said heat exchanger units comprising each a high temperature heat exchanger fabricated from materials capable of withstanding said high temperatures and a low temperature heat exchanger coupled serially therewith, each of said heat exchanger units being removably mounted in a vertically oriented shaft in the wall of said solid block vessel;

d. first means for conducting a portion of a hot gas stream leaving said reactor directly to each of said high temperature heat exchangers where said hot gas is partially cooled by indirect contact with a working fluid in said secondary circuit;

e. second means for conducting said cooled gas from each of said high temperature heat exchangers to said low temperature heat exchangers coupled therewith where said gas is further cooled by indirect contact with said secondary circuit fluid; and

f. means for returning said further cooled gas to said reactor from each of said low temperature heat exchangers by circulating said gas around the periphery of each respective heat exchanger unit.

4,022,660

COATED PARTICLES

James R. Johnson, White Bear Lake, and Harold G. Sowman, Maplewood, both of Minn., assignors to General Atomic Company, San Diego, Calif.

Continuation of Ser. No. 379,401, June 30, 1964, abandoned, which is a continuation-in-part of Ser. No. 90,656, Feb. 21, 1961, Pat. No. 3,151,037. This application Mar. 14, 1974, Ser. No. 451,309

Int. Cl.² G21C *3/06*

U.S. Cl. 176—67 **8 Claims**

1. A nuclear fuel particle which comprises

a central core of normally solid fissionable material in the form of a spherule between about 10 microns and about 250 microns in diameter encased in a shell having at least two concentric layers,

a yielding inner layer of said shell being composed of carbonaceous material and having a thickness between about 5 and about 50 microns, and

an outer layer of said shell being composed of a substantially impermeable refractory material and having a thickness between about 10 and about 100 microns.

4,022,661

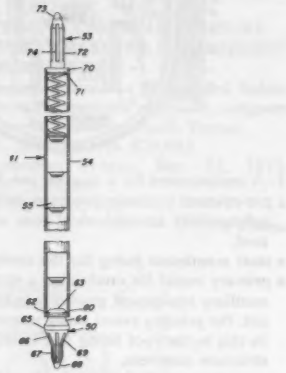
FUEL ROD SUPPORT MEANS

Bart Alan Smith; Kenneth Wood Brayman, and Norman Wayne Pillow, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed May 1, 1975, Ser. No. 573,723

Int. Cl.² G21C *3/10*

U.S. Cl. 176—79 **5 Claims**



1. In a fuel bundle for a nuclear reactor having a plurality of fuel rods supported between spaced tie plates, wherein coolant flows through said tie plates and past said fuel rods, the improvement comprising:

an end plug disposed between an end of each fuel rod and the adjacent tie plate,

at least one of said tie plates having at least one hole to receive one of said end plugs,

the surface of said one tie plate defining said hole and the outer surface of said one end plug being configurated to mate with each other,

said outer surface comprising a cylindrical portion and a continuous conical portion,

serrations in said outer surface to define passages for the flow of coolant therethrough,

said serrations extending unbroken along both said cylindrical and said conical portions,

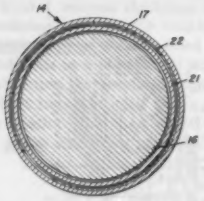
whereby said flow of coolant through said passages minimizes crud buildup at the interface between said end plug and said tie plate.

4,022,662

NUCLEAR FUEL ELEMENT HAVING A METAL LINER AND A DIFFUSION BARRIER

Gerald M. Gordon, Fremont, and Robert L. Cowan, II, Livermore, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Nov. 11, 1974, Ser. No. 522,771
Int. Cl.² G21C 3/20
U.S. Cl. 176—82 26 Claims



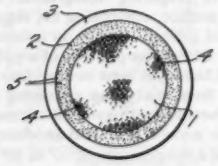
1. A nuclear fuel element comprising (a) a central core of a body of nuclear fuel material selected from uranium compounds, plutonium compounds, thorium compounds and mixtures thereof, (b) a separate unattached metal liner of a constant thickness greater than the longest fission product recoil distance and comprised of a material selected from the group consisting of stainless steel, copper, copper alloys, nickel and nickel alloys surrounding the central core of nuclear fuel material, (c) an elongated clad container selected from the group consisting of zirconium and zirconium alloys surrounding the metal liner so as to leave a gap between the liner and the container and (d) a diffusion barrier selected from the group consisting of chromium alloys being coated on the inside surface of the clad container, said fuel element being assembled so the clad container, the core, and the metal liner are not in direct contact during use in a nuclear reactor.

4,022,663

SPHERICAL FUEL ELEMENTS MADE OF GRAPHITE FOR HIGH TEMPERATURE REACTORS

Milan Hrovat; Hans-Joachim Becker, both of Rodenbach, and Hans Huschka, Hanau, all of Germany, assignors to Hochtemperaturreaktor-Brennelement GmbH, Hanau, Germany

Filed Dec. 11, 1974, Ser. No. 531,743
Claims priority, application Germany, Dec. 14, 1973, 2362088
Int. Cl.² G21C 3/20
U.S. Cl. 176—82 8 Claims



1. A pressed spherical fuel element for high temperature reactors consisting of a graphite matrix having embedded separately therein coated fuel and fertile material particles, said fuel element having a solid spherical nucleus containing only fertile material particles encased by graphite, a zone including the same type of graphite containing only fuel material particles encased by said graphite and concentrically surrounding both said nucleus and said fuel material particle containing zone with a concentric pure graphite shell of the same type of graphite as that in both said fertile material containing nucleus and said fuel material particle containing zone.

4,022,664

PROCESS FOR BIOCHEMICAL OPTICAL RESOLUTION OF ALPHA-TOCOPHERAL

Tamio Kawamura, Inuyama; Satoru Kato; Yasunori Ikeda, both of Ichinomiya, and Noriaki Kuwana, Inuyama, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Nov. 13, 1975, Ser. No. 631,603
Claims priority, application Japan, Nov. 13, 1974, 49-130054
Int. Cl.² C12B 1/00
U.S. Cl. 195—2 16 Claims

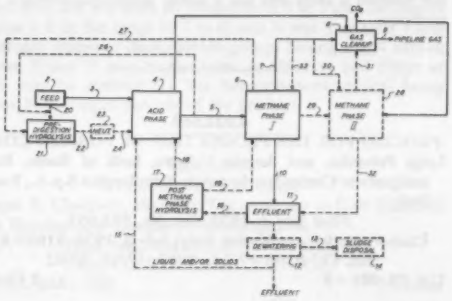
1. A process for biochemical optical resolution of a 2DL-racemic compound of an α-tocopherol ester or substance containing said racemic ester, which comprises mixing said racemic ester or said substance with culture broth, whole cells, culture filtrate or an enzyme product thereof, obtained by cultivating a *Candida sp.*, *Mucor sp.*, *Rhizopus sp.*, *Aspergillus sp.* or *Pseudomonas sp.* microorganism which acts on said racemic ester to more selectively hydrolyze the 2D-isomer or the 2L-isomer of said racemic ester, to obtain α-tocopherol or an ester thereof having a predominant proportion of either the 2D-isomer or the 2L-isomer.

4,022,665

TWO PHASE ANAEROBIC DIGESTION

Sambhunath Ghosh, Chicago, and Donald L. Klass, Barrington, both of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Filed Dec. 9, 1974, Ser. No. 530,760
Int. Cl.² C12D 3/10
U.S. Cl. 195—27 10 Claims



1. A method for producing methane gas by a two phase anaerobic digestion of solid organic waste and biomass containing insoluble materials which includes the improved steps of:

continuously delivering said feed to an acid phase digester at a loading rate of about 1 to about 10 lb. total organics per cubic foot-day,

fermenting the feed in the acid phase digester under anaerobic conditions for a detention time of about ½ day to about 1½ days, at a ph between about 5–6 and a temperature between about 20°–40° C.,

conveying the resultant acid effluent to a separate methane phase digester at a loading rate up from about 0.1 to less than about 2 lb. of total organics per cubic foot-day,

fermenting the acid effluent in the methane phase digester for a detention time of about 2 to about 7 days, at a ph between about 6.8 – 7.4, and a temperature between about 20°–65° C.,

removing the methane for collection, and

removing the feed effluent from the methane phase digester to process the solid and liquid components of the effluent.

4,022,666

ALPHA-AMYLASES FROM *BACILLUS SUBTILIS*

Koji Mitsugi, Kanagawa; Nobuo Kobayashi, Kawasaki; Toshiro Shida, Kawasaki, and Yasunori Yokokawa, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Sept. 9, 1970, Ser. No. 70,656
Claims priority, application Japan, Sept. 12, 1969, 44-72386
Int. Cl.² C07G 7/02
U.S. Cl. 195—62 6 Claims

1. Microbial α-amylase having optimum amyloltyic acitivity at 40° C and at a pH value between 9.0 and 11.5.

4,022,667

SUBSTRATE SOLUTION FOR CARBOXYLIC ESTER HYDROLASE DETERMINATION

James E. Myrick, and Leo M. Hall, both of Birmingham, Ala., assignors to The University of Alabama, Birmingham, Ala.

Filed Sept. 22, 1975, Ser. No. 615,559
Int. Cl.² G01N 31/14
U.S. Cl. 195—103.5 R 44 Claims

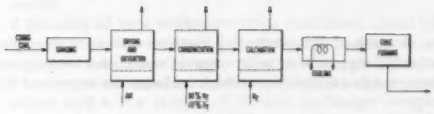
1. A stable, clear reagent solution for the analysis of carboxylic acid ester hydrolases which comprises a water insoluble vinyl ester of a carboxylic acid, a nonionic detergent, a buffer, and neutral salts, wherein the value of the HLB of said detergent is from 13 to 18, said HLB value being chosen to obtain the highest specific activity for said ester hydrolase; wherein the ionic strength of said solution is adjusted by inclusion of said neutral salts to obtain the highest specific activity for said ester hydrolase; and wherein the amounts of said ester, detergent and buffer, said HLB value and said ionic strength are chosen so that when said hydrolase is mixed with said reagent, the mixture is clear and has a stable spectrophotometric absorbance.

4,022,668

PROCESS FOR THE PRODUCTION OF FORMED COKE

Luigi Palumbo, and Angelo Colletta, both of Rome, Italy, assignors to Centro Sperimentale Metallurgico S.p.A., Rome, Italy

Filed July 3, 1975, Ser. No. 593,052
Claims priority, application Italy, July 3, 1974, 51893-A/74
Int. Cl.² B10B 47/24, 49/02, 53/04, 57/02
U.S. Cl. 201—5 2 Claims



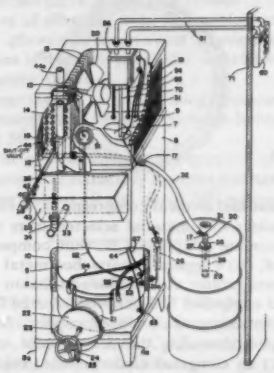
1. In a process for the production of formed coke, comprising grinding coal, heating the ground coal in the presence of oxygen in a drying and oxidation phase, heating the ground coal at a higher temperature in a carbonization phase, heating the coal at a still higher temperature in a calcination phase to obtain semi-coke, cooling the obtained semi-coke, and thereafter briquetting, hardening and baking the semi-coke to produce formed coke; the improvement comprising conducting said drying and oxidation phase in a fluidized bed at a temperature of 100° to 280° C. for a time of 10 to 30 minutes, and conducting said carbonization phase in a fluidized bed at a temperature of 300° to 600° C. for a time of 10 to 30 minutes, the gas fed to said fluidized bed of said carbonization phase consisting essentially of 90% by volume nitrogen and 10% by volume oxygen.

4,022,669

EQUIPMENT FOR CLEANING SOLVENTS

Frede Hilmar Drostholm, Vedbaek; Kaj Ditlev Frederik Petersen, Valby, and Ulf Raabo, Graested, all of Denmark, assignors to Frede Hilmar Drostholm, Vedbaek, Denmark

Division of Ser. No. 352,261, April 18, 1973, Pat. No. 3,891,510. This application June 24, 1975, Ser. No. 589,843
Int. Cl.² B01D 3/42
U.S. Cl. 202—160 6 Claims



1. Equipment for cleaning solvents comprising a distillation tank having a heater and a vapor offtake, a power circuit for operating said heater, a filling funnel in fluid flow communication with the upper portion of the distillation tank and having a displaceable lid, a vent connection in fluid flow communication with the upper portion of the distillation tank and having a shut-off valve, and means interconnecting the lid and said shut-off valve and providing for opening of the shut-off valve when the lid is displaced to open the filling funnel.

4,022,670

PROCESS FOR PREPARATION OF LITHOGRAPHIC PRINTING PLATES

Sheldon W. Dean, Allentown, Pa., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed July 16, 1975, Ser. No. 596,307
Int. Cl.² C25D 11/06, 11/08, 11/10, 11/18
U.S. Cl. 204—38 A 7 Claims

1. A process of preparing lithographic aluminum sheet having a grained surface, comprising the steps of:

a. anodizing said grained sheet in an aqueous solution containing up to 250 grams per liter of a polybasic aromatic sulfonic acid having at least one nuclear acidic constituent selected from the group consisting of a carboxylic acid and a phenolic hydroxyl, and a lesser concentration of a polybasic mineral acid, said anodizing solution being maintained at a temperature of 10° to 80° C and effecting the anodization within 1 to 30 minutes, at a potential of 20 to 150 volts and a current density of 5 to 100 amperes per square foot, whereby to produce a porous anodic oxide surface coating on said grained sheet;

b. coating the anodized sheet with a photosensitive layer;

c. exposing said photosensitive layer to light through a stencil or a photographic negative to develop hardened areas on said photosensitive layer at points which the light passing through said stencil or negative contacts said layer; and

d. washing said sensitized layer to remove those areas not contacted by light, leaving the light-hardened areas as oelophilic receptors for subsequently applied oleaginous printing ink.

4,022,671
ELECTROLYTIC COLORING OF ANODIZED ALUMINUM

Tahei Asada, Tokyo, Japan, assignor to Alcan Research and Development Limited, Montreal, Canada

Filed Apr. 20, 1976, Ser. No. 678,696
Int. Cl.[2] C25D *11/12, 11/22*
U.S. Cl. 204—42 6 Claims

1. A process for the production of a coloured anodized aluminum article which comprises forming a porous anodic oxide film of at least 1 micron thickness on aluminum by direct current anodizing in a sulfuric acid-based electrolyte, continuing the anodization of the anodized aluminum under direct current conditions in a phosphoric acid-based electrolyte and finally subjecting the anodized aluminum to passage of alternating current between itself and a counterelectrode while immersed in a bath containing a salt of at least one metal selected from the group consisting of nickel, cobalt and tin.

4,022,672
ELECTROCHEMICAL SYNTHESIS OF INSECTICIDE INTERMEDIATES

Manuel Alvarez, East Brunswick, and Morris L. Fishman, East Windsor, both of N.J., assignors to FMC Corporation, Philadelphia, Pa.

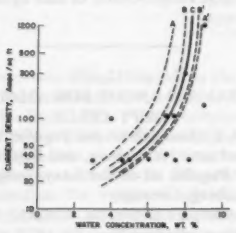
Filed Apr. 2, 1976, Ser. No. 673,038
Int. Cl.[2] C25B *3/04*; C07C *21/00*
U.S. Cl. 204—59 R 12 Claims

1. In a process for producing a pyrethroid insecticide via a 1,1-dihalo-4-methylpentadiene, the improved synthesis of said 1,1-dihalo-4-methylpentadiene which comprises reducing electrochemically a 2-substituted 1,1,1-trihalo-4-methylpentene; wherein the 2-substituent is selected from those conjugate bases of Bronsted acids which are leaving groups in beta eliminations; whereby one halogen atom and the 2-substituent are eliminated with the introduction of a second double bond, yielding said 1,1-dihalo-4-methylpentadiene.

4,022,673
ELECTROCHEMICAL PRODUCTION OF 1,4-DIHYDRO AROMATIC COMPOUNDS

John F. Connolly, Wheaton, and Robert J. Flannery, Olympia Fields, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 19, 1975, Ser. No. 642,407
Int. Cl.[2] C25B *3/04*
U.S. Cl. 204—73 R 21 Claims



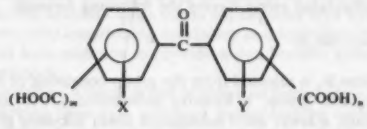
1. In combination with a process for the production of a 1,4-dihydro aromatic hydrocarbon compound comprising electrochemically reducing at a cathode in an electrochemical cell, a condensed-ring aromatic hydrocarbon compound having at least two aromatic rings dissolved in an organic solvent-electrolyte system containing water, introducing and dissolving ammonia into said system and concurrently oxidizing said ammonia and evolving nitrogen at an anode in said electrochemical cell, wherein the improvement comprises reducing said aromatic hydrocarbon compound at a current density in the range of from about 100 to about 1200 amperes per square foot and in the presence of water at a concentration level in said system in the range shown between curves A and A' for a particular current density in FIG. 2 and impressing a voltage between said anode and cathode which is sufficient to provide said current density.

4,022,674
PHOTOPOLYMERIZABLE COMPOUNDS AND COMPOSITIONS COMPRISING THE PRODUCT OF THE REACTION OF A MONOMERIC ESTER AND A POLYCARBOXY-SUBSTITUTED BENZOPHENONE

George Rosen, Wayne, N.J., assignor to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 405,518, Oct. 11, 1973, Pat. No. 3,926,641, which is a continuation-in-part of Ser. No. 200,174, Nov. 18, 1971, abandoned. This application May 12, 1975, Ser. No. 576,545
Int. Cl.[2] C08F *2/46, 4/00*
U.S. Cl. 204—159.22 8 Claims

1. A photopolymerizable compound comprising the product of the reaction of (1) a monomeric hydroxy-containing polyethylenically unsaturated ester or (an) a monomeric isocyanatemodified hydroxy-containing polyethylenically unsaturated ester which is the product of the reaction of (a) an ethylenically unsaturated acid and (b) a polyhydric alcohol and (2) a polycarboxy-substituted benzophenone acid or anhydride having the formula

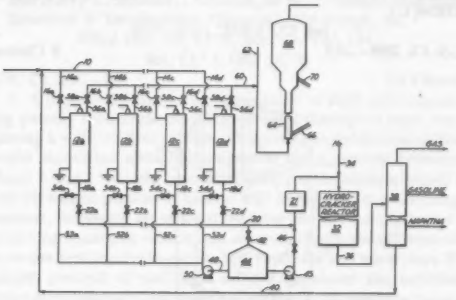


wherein *m* and *n* is each an integer from 0 to 3 and the sum of *m* plus *n* is in the range of 2 to 6; and X and Y is each 1 and 4 halogen atoms or dialkylamino groups having 1 to 4 carbon atoms; X and Y may be the same or different and either or both may be omitted (.), the benzophenone moiety being about 5–50 weight percent of the product.

4,022,675
FILTERING PROCESS

Joseph D. Chachere, Houston, Tex., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Aug. 1, 1975, Ser. No. 601,024
Int. Cl.[2] B03C *5/00*; C10G *11/00*
U.S. Cl. 204—188 7 Claims



1. A method of removing finely divided solids from liquid hydrocarbon feed stock for a process utilizing a fixed bed of catalyst comprising passing the feed stock through an electrofilter containing a permeable bed of ceramic spheres while applying a voltage differential of 5 to 20 kilovolts per inch across the bed whereby finely divided solids suspended inthe liquid hydrocarbon are deposited on the spheres, periodically decharging the electrofilter, backflushing the permeable bed

by flowing a nonconductive backflush liquid compatible with the liquid hydrocarbon feed stock upwardly through the permeable bed at a rate adapted to expand the permeable bed and remove solids deposited on the spheres while the electrofilter is decharged, delivering backflush liquid and entrained solids discharged from the electrofilter during backflushing into a petroleum refinery fluidized process for the treatment of petroleum hydrocarbons, delivering filtered liquid discharged from the electrofilter while the electrofilter is electrically charged to the fixed bed of catalyst, removing with solid particles removed from the fluidized process solid particles delivered with the backflush liquid to the fluidized process, and repeating the cycle of alternately filtering the hydrocarbon feed stock and backflushing the permeable bed.

4,022,676

ALKALINE BRIGHT ZINC ELECTROPLATING BATH

Francine Popescu, 32 rue E. Dolet, 94 St. Maur, France

Filed Apr. 8, 1976, Ser. No. 674,960

Claims priority, application France, Apr. 9, 1975, 75.11045

Int. Cl.² C25D *3/24*

U.S. Cl. 204—55 R **30 Claims**

1. In an electrolytic alkaline bath for electrodepositing bright zinc and comprising an aqueous solution of an alkaline zincate, the improvement which comprises:

a polymer characterized by recurrent units of an alkylene amine wherein nitrogen atoms are bound to an aliphatic sulfoxylated group having the following formula:

$$-R_1-SO_2M$$

where R_1 is selected from the group consisting of a lower alkylene group, a hydroxy substituted lower alkylene group, a lower alkyl substituted lower alkylene group, a lower alkoxy substituted lower alkylene group, a lower alkoxy substituted lower alkene group; where M is selected from the group consisting of hydrogen, an alkali metal, zinc, and ammonium; where "lower" means having from one to four carbon atoms; and where said polymer is present in an effective concentration to produce bright, ductile, uniform, non-blistering zinc deposits.

4,022,677

ELECTROLYTIC CELL

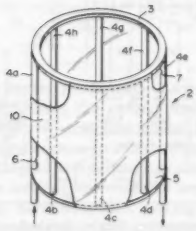
Yoshio Idota, and Haruo Shibaoka, both of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Feb. 23, 1976, Ser. No. 660,385

Claims priority, application Japan, Feb. 21, 1975, 50-23856[U]

Int. Cl.² C25C *1/20, 7/00*

U.S. Cl. 204—263 **9 Claims**



1. An electrolytic cell comprising a cathode, an anode and a diaphragm provided therebetween wherein the improvement comprising a diaphragm support means including a plurality of support columns to which said diaphragm is attached, at least two of said support columns being made hollow in structure, one of said hollow support columns being provided with a solution supply port, another of said hollow support columns being provided with a solution take-out port.

4,022,678

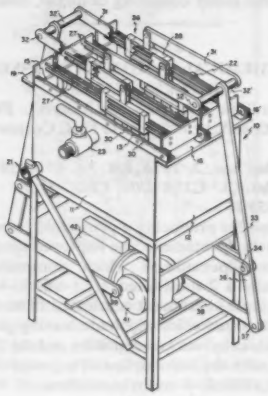
ELECTROLYTIC CELL

Bruce C. Wojcik, 350 Blue Lakes Blvd. North, Twin Falls, Idaho 83301; Wilfred H. Herrett, Box Z, Filer, Idaho 83328; Gerald D. Cooper, Rte. No. 2 North, Box 106, Pocatello, Idaho 83201; Reed Goold, Rte. No. 4, Twin Falls, Idaho 83301, and Charles W. Wojcik, 1004 Delmar Drive, Twin Falls, Idaho 83301

Filed Apr. 14, 1975, Ser. No. 567,949

Int. Cl.² C25C *1/00, 7/00*

U.S. Cl. 204—273 **9 Claims**



1. An electrolytic cell comprising a tank, at least one anode plate and one cathode plate suspended in said tank in spaced parallel relationship to each other defining a compartment therebetween, an agitator assembly in said compartment between said anode and cathode plates comprising at least one shaped member, rigid means mounting said agitator for reciprocating movement in a fixed path between said plates and means included in said agitator assembly for continuously directing a preselected volume of tank contents toward each of said plates upon reciprocation of said agitator assembly in said compartment.

4,022,679

COATED TITANIUM ANODE FOR AMALGAM HEAVY DUTY CELLS

Konrad Koziol, Rothenbach an der Pegnitz; Karl-Heinz Sieberer, Zirndorf near Nuremberg, and Baptist Zenk, Rothenbach an der Pegnits, all of Germany, assignors to C. Conradty, Nuremberg, Germany

Continuation-in-part of Ser. No. 468,632, May 9, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,384

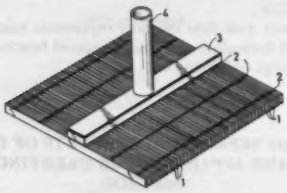
Claims priority, application Germany, May 10, 1973, 2323497

Int. Cl.² C25B *11/02, 11/08, 11/10*

U.S. Cl. 204—286 **7 Claims**

1. A coated titanium anode for electrically highly loaded amalgam cells, particularly for use at anodic current densities D_A greater than 10 kA/m², said anode comprising substantially horizontally extending completely coated anode segments having a clear lateral spacing of at least 1.5 mm and upwardly extending lateral surfaces, and each having an active coated upwardly extending part extending to a height of more than 5 mm and not exceeding 20 mm, measured from the horizontal undersurface of the anode, wherein the actual active surface

of said upwardly extending parts, up to heights thereof of 5 mm, 7.5 mm, 10 mm and 15 mm, respectively, exceeds at least 2.5, 3.33, 4 and 4.5 times, respectively, the projected horizontal anode area which is the total area bounded by the periphery of the anode, and wherein at least half the actual active surface extends upwardly relative to the horizontal base area of the anode.

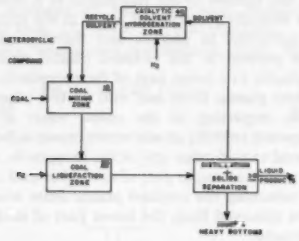


4,022,680

HYDROGEN DONOR SOLVENT COAL LIQUEFACTION PROCESS

Peter S. Maa, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Dec. 17, 1975, Ser. No. 641,489
Int. Cl.² C10G *1/06*
U.S. Cl. 208—8 21 Claims



1. A process for producing coal liquids by the conversion of coal at coal liquefaction conditions, which comprise:

passing through a liquefaction zone at temperatures ranging from about 700° F to about 950° F, and pressures ranging from about 300 psia to about 300 psia, coal slurried in a solvent containing at least about 0.8 percent donatable hydrogen, based on the weight of solvent, to which has been added in quantity ranging from about 3 to about 50 percent, based on the weight of total solvent, a polar, stable compound characterized as

i. a low molecular weight heterocyclic oxygen compound containing from two to about six fused rings, one or more of which is a five- or six-membered heterocyclic ring having from 4 to 5 carbon atoms in the nucleus, and from one to two atoms of oxygen; or

ii. a low molecular weight heterocyclic sulfur compound containing from two to about six fused rings, one or more of which is a five- or six-membered heterocyclic ring having from 4 to 5 carbons atoms in the nucleus, and from one to two atoms of sulfur

sufficient to increase the yields of liquids produced from said coal.

4,022,681

PRODUCTION OF MONOAROMATICS FROM LIGHT PYROLYSIS FUEL OIL

Ming Nan Sheng, Cherry Hill, N.J.; Walter Anthony Mamenskis, Drexel Hill, and Patrick Walter Ryan, Glenn Mills, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 24, 1975, Ser. No. 644,252
Int. Cl.² C10G *37/06*
U.S. Cl. 208—57 4 Claims

1. The method converting naphthalene type hydrocarbonaceous compounds in the light gas oil byproduct from olefin production by pyrolysis in steam of a hydrocarbon fraction which method includes the steps of:

treating sodium mordenite with acid to provide a hydrogen mordenite having a silica to alumina unit mol ratio greater than 15 but less than 70, said hydrogen mordenite being represented approximately by a formula $H_2Al_2Si_nO_{3+2n}$ in which n is within the range from 15 to 70;

treating said hydrogen mordenite with a solution of a salt of at least one hydrogenating metal to provide stabilized composition containing from about 0.5% to about 7% of a stabilized hydrogenating metal component;

activating said stabilized metal mordenite by treatment with hydrogen at a temperature from about 350° C to about 500° C for several hours to provide an activated hydrocracking catalyst;

hydrogenating said naphthalene type hydrocarbonaceous compounds at tetralinizing conditions saturating one of the two aromatic rings of the naphthalene type hydrocarbons, said tetralinizing conditions also hydrodesulfurizing said hydrocarbons to provide a desulfurized tetralinized feedstock;

subjecting said desulfurized tetralinized feedstock to hydrocracking over said activated hydrocracking catalyst by directing said feedstock through a reaction zone containing a fixed bed of said activated hydrocracking catalyst of from about 350° to 500° C at a liquid hydrocarbon space velocity of from about 0.5 to about 2 liquid volumes of feedstock at a hydrogen to feedstock unit mol ratio of from about 2 to about 5 to achieve an advantageous ratio of monocyclic aromatics to bicyclic aromatics in the normally liquid effluent from said reaction zone.

4,022,682

HYDRODENITROGENATION OF SHALE OIL USING TWO CATALYSTS IN SERIES REACTORS

Joseph A. Bludis, Pittsburgh; David Lyzinski, Allison Park; Joel D. McKinney; Raynor T. Sebulsky, both of Pittsburgh, and Harry C. Stauffer, Cheswick, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 22, 1975, Ser. No. 643,191
Int. Cl.² C10G *34/00*
U.S. Cl. 208—89 18 Claims

1. A process for hydrodenitrogenation of shale oil comprising passing feed shale oil and hydrogen through a zone containing a sulfided first catalyst comprising molybdenum as the major supported metallic component in an amount between about 1 and 15 weight percent together with between about 1 and 10 weight percent of Group VIII metal on a non-cracking support, removing an effluent oil from the first catalyst zone, removing hydrogen sulfide and ammonia from the effluent oil from the first catalyst zone, in said first zone not more than 20 weight percent of said feed oil boiling above the naphtha range is converted to oil boiling in or below the naphtha range, passing the effluent oil from the first catalyst zone and hydrogen through a zone containing a sulfided second catalyst comprising tungsten in an amount between about 1 and 25 weight percent together with between about 1 and 25 weight percent of Group VIII metal on a non-cracking support, the temperature in said zones being between about 650° and 800° F., the hydrogen pressure in said zones being between about 500 and 5,000 psi, and the liquid hourly space velocity in said

zones being between about 0.1 and 5.0, and removing an effluent stream from said second catalyst zone.

4,022,683

HYDRODENITROGENATION OF SHALE OIL USING TWO CATALYSTS IN PARALLEL REACTORS

Joseph A. Bludis, Pittsburgh; David Lyzinski, Allison Park; Joel D. McKinney; Raynor T. Sebulsky, both of Pittsburgh, and Harry C. Stauffer, Cheswick, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 22, 1975, Ser. No. 643,190

Int. Cl.² C10G *23/02*

U.S. Cl. 208—92 **19 Claims**

1. A process for the hydrodenitrogenation of shale oil comprising passing a feed shale oil to a distillation zone, removing a relatively low boiling fraction and a relatively high boiling fraction from said distillation zone, passing said low boiling fraction and hydrogen through a zone containing a first catalyst comprising molybdenum as the major supported metallic component in an amount between about 1 and 15 weight percent together with between about 1 to 10 weight percent of Group VIII metal on a non-cracking support, not more than 20 weight percent of said low boiling fraction boiling above the naphtha range being converted to material boiling in or below said naphtha range, passing said high boiling fraction and hydrogen through a zone containing a second catalyst comprising tungsten in an amount between 1 and 25 weight percent together with between about 1 and 25 weight percent of Group VIII metal on a non-cracking supporting material, the temperature in said zones being between about 650° and 800° F. and the hydrogen pressure in said zones between about 500 and 5,000 psi.

4,022,684

HYDROCARBON CONVERSION PROCESS USING A NI AND/OR CO SUBSTITUTED SYNTHETIC ALUMINOSILICATE CATALYST

Edgar R. Black, Aspinwall; Angelo A. Montagna, Monroeville, and Harold E. Swift, Gibsonia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Division of Ser. No. 461,907, April 18, 1974, Pat. No. 3,966,642, which is a continuation-in-part of Ser. No. 441,059, Feb. 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 291,263, Sept. 22, 1972, abandoned. This application Apr. 26, 1976, Ser. No. 680,028

Int. Cl.² C10G *13/08*; C07C *5/30*; B01J *27/12*

U.S. Cl. 208—111 **41 Claims**

1. A process for the conversion of hydrocarbons in the presence of hydrogen which comprises contacting a mixture of hydrogen and said hydrocarbons under hydrocarbon conversion conditions with a catalyst comprising:

a laminar 2:1 layer-lattice aluminosilicate mineral possessing layer-lattice unit cells, each cell having an inherent negative charge balanced by cations exterior to said unit cell, said mineral corresponding to the following overall formula prior to drying and calcining:

$$[(Al_{4-ew}{}^{3+}Y_{ew}{}^{2+})^{IV}(Q_{8-x}{}^{4+}Al_x{}^{3+})^{IV}O_{20}(OH)_{4-f}F_f]\cdot[dC^{e+}]$$

where

Al is aluminum;

Y is selected from the class consisting of nickel, cobalt and mixtures thereof;

Q is at least 0.95 mol fraction silicon ions, the remainder consisting of tetravalent ions having an ionic radius not to exceed 0.65 A; and

F is fluorine;

C is at least one charge-balancing cation; and where e has a numerical value from 2 to 3 inclusive;

w has a numerical value from 0.01 to 2 inclusive, with the proviso that the quantity ew have a numerical value from 0.02 to 4 inclusive;

f has a value of 4 or less;

x has a numerical value from 0.05 to 2.0 inclusive;

y is the valence of the cation C;

d is the number of cations C where the product $dy = x + 3(e-2)w$;

and wherein said first bracket represents said layer-lattic unit cell formulation and said second bracket represents said charge-balancing cations.

4,022,685

METHOD OF SEPARATING PRODUCTS OF DIFFERENT DENSITY AND APPARATUS FOR CARRYING OUT THE METHOD

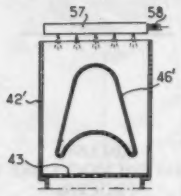
Michel Tisseau, La Faucherie, l'Houmeau, 17140 Lagord, France

Filed May 23, 1975, Ser. No. 589,781

Claims priority, application France, June 28, 1974, 74.22721

Int. Cl.² B03B *5/66*

U.S. Cl. 209—157 **9 Claims**



1. A method for the separation of scrap plastic from impurities contained therein, comprising crushing scrap plastic, introducing the crushed scrap plastic into a horizontally elongated receptacle containing water, injecting water under pressure into the bottom of the receptacle in a direction both to create an ascending current of water in the receptacle with a velocity sufficient to entrain and thereby move upwardly impurities present in the crushed plastic while leaving the crushed plastic in a lower part of the receptacle, and to move the crushed plastic from one end to the other end in said receptacle, imparting to the rising water a progressively greater upward velocity as said water moves substantially from said one end to said other end of the receptacle, removing said impurities from an upper part of said other end of the receptacle, and removing the crushed plastic from which impurities have been removed from the lower part of said other end of the receptacle.

4,022,686

FLOTATION PROCESS FOR COPPER ORES AND COPPER SMELTER SLAGS

Akira Arakatsu, Tokyo; Hajime Nakazawa, Ichikawa, and Hiroshi Naruse, Kokubunji, all of Japan, assignors to Sumitomo Metal Mining Co., Limited, Japan

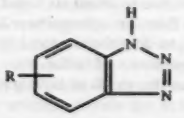
Filed Feb. 20, 1976, Ser. No. 659,965

Claims priority, application Japan, Mar. 15, 1975, 50-29474; Nov. 25, 1975, 50-140964

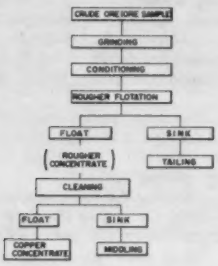
Int. Cl.² B03D *1/06*

U.S. Cl. 209—166 **9 Claims**

1. A flotation process for copper ores and copper smelter slag comprising grinding copper-bearing material, adding a compound of the following formula:



wherein R represents one member selected from the group consisting of hydrogen atom and alkyl groups containing 1 to 20 carbon atoms to the resulting ground material and further



adding at least one member selected from the group consisting of xanthates, dithiophosphates, thiocarbamate esters, dithiocarbamates, mercaptans and dixanthogens as a collector.

4,022,687

METHOD FOR THE NON-MECHANICAL CONVEYING OF A COLLECTED QUANTITY OF LIQUID AND APPARATUS FOR THE PERFORMANCE OF THE METHOD

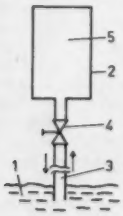
Benno Perren, Austrasse 33, 5430 Wettingen, Switzerland

Filed Mar. 21, 1975, Ser. No. 560,683

Claims priority, application Switzerland, Mar. 28, 1974, 4383/74

Int. Cl.² E02B *15/04*

U.S. Cl. 210—65 **5 Claims**



1. A method for cleaning oil spills from the surface of a body of water comprising the steps of:

providing a container of liquid having a greater specific gravity than the specific gravity of the spilled oil, said container having at least one flow path therethrough;

positioning said container at a location relative to the surface of the body of water such that at least a portion of the greater specific gravity liquid therein is at a greater elevation than the elevation of the surface of the oil;

communicating, via said flow path, the liquid in said container with the surface of the oil; and

conveying, in substantially countercurrent flow relation through said flow path, the liquid in said container toward a lower elevation and the oil toward a higher elevation within said container by utilization of the different specific gravities of the liquid and oil.

4,022,688

METHOD AND DEVICE FOR SEPARATING EMULSIONS

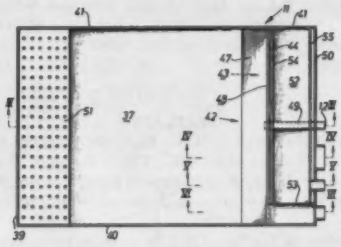
Karl Oskar Wikholm, Bergtorpsvägen 62, 183 64 Taby, Sweden

Filed Dec. 16, 1975, Ser. No. 641,590

Claims priority, application Sweden, Dec. 16, 1974, 7415795

Int. Cl.² B01D *35/18*; C02B *1/02*

U.S. Cl. 210—71 **28 Claims**



1. In a method for separating emulsions containing water, an emulsifying agent, petroleum products and possible contaminants, such method including feeding an emulsion through an inlet into at least one separation chamber containing previously separated water and a layer floating thereon, said layer including previously separated petroleum products; allowing said emulsion to self-separate under the influence of gravity, so that the lighter components thereof aggregate toward said layer, the uppermost part of which is successively removed, and the water component thereof intermixes with the previously separated water, which is successively discharged through an outlet opening at the bottom portion of the separation chamber; the improvement comprising:

feeding said emulsion through said inlet into said separation chamber under controlled horizontal laminar flow immediately below said layer;

simultaneously controlling the temperature of said emulsion being fed into said chamber so as to exceed the temperature of the previously separated water, so as to provide a density difference therebetween sufficient to enable said emulsion to propagate

freely and horizontally into a thin, continuous emulsion layer floating between said petroleum layer and said previously separated water; and

intermittently discontinuing the feed of said emulsion for time periods sufficient to permit said emulsion layer to self-separate while being substantially stagnant.

12. In a device for separating emulsion containing water, an emulsifying agent, petroleum products and possible contaminants, said device being of the type including at least one separation chamber having an inlet; means for feeding through said inlet an emulsion containing water, an emulsifying agent, petroleum products and possible contaminants; said separation chamber having means for removal from said separation chamber of the uppermost part of a petroleum layer floating on previously separated water and receiving lighter components of said emulsion upon separation of the latter under the influence of gravity; and an outlet opening at the bottom portion of the separation chamber for successive removal of the previously separated water; the improvement comprising;

said inlet of said separation chamber being situated immediately below the level of said means for removal of the uppermost part of said petroleum layer and comprising means for feeding said emulsion into said separation chamber under controlled horizontal laminar flow immediately below said layer;

an inner space of said separation chamber at the level of said inlet being substantially free of obstruction; heating

control means, associated with said feeding means, for controlling the temperature of said emulsion being fed into said separation chamber so as to exceed the temperature of the previously separated water, so as to provide a sufficient density difference therebetween to cause said emulsion flowing into said chamber to propagate freely and horizontally into a thin, continuous emulsion layer floating between the petroleum layer and the previously separated water; and

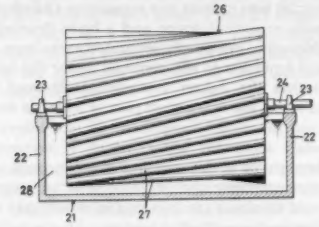
means associated with said feeding means, for intermittently discontinuing the feed of said emulsion through said feeding means for time periods sufficient to permit said emulsion layer to self-separate while being substantially stagnant.

4,022,689

ROTATING MULTITUBE BIOCONTACTOR FOR TREATING SEWAGE

Masashi Kato; Itsuko Kato; Shouichi Kato; Yasushi Kato, and Takashi Kato, all of No. 5-2, 1-chome, Houjo, Daito, Osaka, Japan

Continuation of Ser. No. 476,570, June 4, 1974, abandoned. This application Apr. 12, 1976, Ser. No. 675,893
Claims priority, application Japan, June 20, 1973, 48-70112
Int. Cl.² C02C *1/04*
U.S. Cl. 210—151 **8 Claims**



1. A rotary multi-tube bicontactor apparatus for treating fluids comprising:

an open trough for containing the fluid to be treated;

a rotary rod attached across said trough above the surface of the fluid therein;

rotating means attached to said rotary rod for rotating said rotary rod; and

a plurality of tube means longitudinally askew to and surrounding said rotary rod, longitudinally askew to each other, partially submerged in the fluid in said trough, and operatively connected to said rotary rod for moving in and out of the fluid in said trough as said rod rotates, each tube means comprised of:

a plurality of tubes, and

binding means surrounding said tubes for holding said tubes together, whereby a tube bundle is formed.

4,022,690

INTEGRAL PUMP SKIMMER AND FILTER UNIT FOR ABOVE-GROUND SWIMMING POOLS

Clarence G. Smith, Pomona, Calif., assignor to Muskin Corporation, Colton, Calif.

Filed Jan. 8, 1976, Ser. No. 647,571
Int. Cl.² E04H *3/16*
U.S. Cl. 210—169 **1 Claim**

1. A pump and filter unit for mounting on an above-ground swimming pool having a sidewall with a filtered-water inlet opening and a skimmer outlet opening, the unit being adjustable in height to compensate for variations in spacing of the skimmer outlet opening above a lower edge of the pool sidewall, the unit comprising:

a base having hook means extending therefrom and configured to engage the lower edge of the pool sidewall to secure the base to the pool;

a support bracket secured to and extending upwardly from the base;

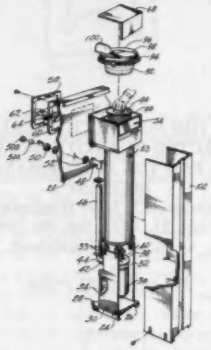
a pump-and-motor assembly having a pump and motor which are coupled together and arranged vertically one above the other, the pump and motor being secured to the support bracket and having rotation axes which are substantially vertical, the pump having fluid inlet and outlet fittings;

a filtered-water delivery pipe having one end connected to the pump outlet fitting and having a second end adapted for connection to the pool sidewall at the sidewall filtered-water inlet opening;

an upright cover enclosing the pump-and-motor assembly and being releasably secured to the support bracket to enable access to the pump and motor without requiring removal of the unit from the pool;

an upright cylindrical filter housing disposed above the pump-and-motor unit, the filter housing having a closed lower end and an open upper end, the housing including an outlet conduit sealed to and extending through the lower end of the filter housing, the conduit having a lower end connected to the pump inlet fitting;

a filter element supported in the filter housing and having a permeable outer surface permitting filtering flow of water through the outer surface into the interior of the filter element;



means of the lower end of the filter element for coupling the interior of the element of the filter-housing outlet conduit to enable flow of filtered water to the pump;

a skimmer housing secured to the open upper end of the filter housing, the skimmer housing having a bottom wall with an opening therethrough permitting fluid flow into the filter housing around the filter element, and having a side surface adapted for connection to the pool sidewall, the side surface having an opening therethrough for alignment with the pool skimmer outlet opening;

a buoyant weir member movably mounted along its lower edge on the skimmer housing to position the weir member for floating movement of the upper edge of the member in the skimmer housing;

a perforate strainer basket supported at the bottom wall of the skimmer housing over the open upper end of the filter housing for collecting debris in water received through the skimmer-housing side-surface opening and flowing over the weir downwardly into the filter housing; and

adjustable connection means on the filter housing and the support bracket for securing the filter housing to the bracket at a variable spacing from the base to enable alignment of the skimmer-housing side-surface opening with the pool-sidewall skimmer outlet opening when the base is secured by the hook means to the lower edge of the pool sidewall.

4,022,691

MIXING CHAMBER FOR THICKENING SEWAGE SLUDGE BY MEANS OF A FLOCCULATION AGENT COMBINED WITH OVERFLOW DRAINAGE MEANS

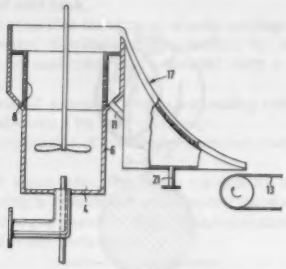
Hans Jurgen Heinrich, Wilhelmshoherstr. 129, 5828 Ennepetal, Germany

Filed Apr. 6, 1976, Ser. No. 674,233

Claims priority, application Germany, Dec. 18, 1975, 2556995

Int. Cl.² B01D *33/14*

U.S. Cl. 210—202 5 Claims



1. A mixing chamber for thickening sludge, especially sludge in a sewage clarification plant by means of agitation and addition of a flocculating agent, in combination with a drainage system to move the sludge out of the mixing chamber, comprising

a generally cylindrical housing having a cup-like bottom portion and a widened upper portion;

agitating means in said housing defining a mixing zone at the lower portion thereof;

an inlet means for raw sewage connected to said bottom portion defining a feeding zone;

an inlet pipe within and penetrating into said inlet means of smaller diameter than said inlet means which is adapted to add a flocculating agent to the sludge to thereby cause thickening of said sludge in said mixing zone;

the widened upper portion of said housing comprising a perforated inner wall coextensive with the bottom portion of said housing and an outer wall spaced from said inner wall defining an annular chamber;

a separate outlet for said annular chamber;

said perforated inner wall constituting means for dewatering the thickened sludge in said housing about said annular chamber in a zone directly above the feeding zone and the mixing zone;

a dewatering means including pipe means extending from the upper portion of said housing outside of said housing to a drainage system and an outlet on said pipe means to deliver thickened sludge from said mixing chamber to said draining system; and

a further drainage means of said drainage system outside of said mixing chamber for further dewatering of said sludge adapted for subsequent storage or conveying of said sludge.

4,022,692

NON-WOVEN SUPPORT SCREEN FOR MASS TRANSFER DEVICES

Howard A. Janneck, Fort Lee, N.J., assignor to Erika, Inc., Engelwood Cliffs, N.J.

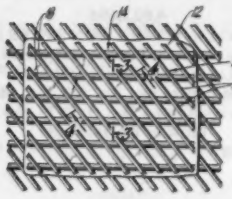
Filed Aug. 1, 1975, Ser. No. 601,193

Int. Cl.² B01D *31/00*

U.S. Cl. 210—321 B 9 Claims

1. An improved non-woven support screen for mass transfer devices of the type having a support screen and a fluid transfer membrane therein, wherein the improvement comprises:

an array of filaments of round cross-sectional area to prevent damage to the membrane including a first set of filaments spaced parallel to one another in a first plane and a second set of filaments spaced parallel to one another in a second plane, said filaments of said first set having centerlines spaced a distance of between about 1.88 to about 2.54 times the spacing between the centerlines of said filaments of said second set, said sets of filaments being affixed to one another at their crossover points and said second set of said filaments being



obliquely arranged relative to said first set of filaments, the thickness of the filaments of said second set being between about 0.37 to about 0.67 times the thickness of said filaments of said first set to substantially minimize masking of the membrane by controlling membrane distention.

4,022,693

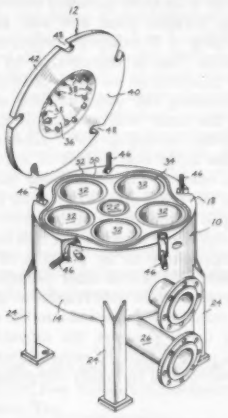
LIQUID FILTER HAVING MULTIPLE FILTERING ELEMENTS

Howard William Morgan, Jr., Michigan City, Ind., assignor to Filter Specialists, Inc., Michigan City, Ind.

Continuation of Ser. No. 552,536, Feb. 24, 1975, abandoned. This application June 10, 1976, Ser. No. 694,820

Int. Cl.² B01D *29/10*

U.S. Cl. 210—345 10 Claims



1. A filter comprising a housing including side and bottom walls and having a top wall spaced from said bottom wall, said housing having a liquid outlet, said housing top wall having at least two spaced openings formed therein, removable bag-shaped filtering means for straining a liquid having an open upper end fitted into each top wall opening, each filtering means being supported by said top wall at its open end projecting into the interior of said housing below said top wall, a removable cover spanning said housing top wall, said cover including a peripheral lower face portion and an inner upper face portion upwardly offset from said lower face portion, said cover lower face portion overlying only a section of each filtering means at its open end to retain said filtering means within said housing top wall openings, said cover upper face portion being spaced from said housing top wall and from

each filtering means at its open end to provide flow passages from the upper face portion to each filtering means open end, and a liquid inlet in communication with said cover upper face portion whereby liquid can pass through the inlet into the filtering means and thereafter through said filtering means and into the interior of said housing and out the outlet therein.

4,022,694

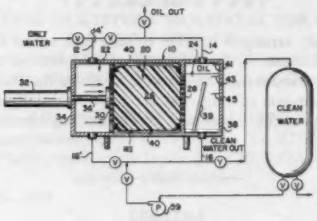
OIL-WATER SEPARATION APPARATUS

Daniel H. Fruman, Le Pecq, France, assignor to Hydronautics, Incorporated, Laurel, Md.

Continuation-in-part of Ser. No. 467,466, May 6, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,131

Int. Cl.² B01D *29/38*

U.S. Cl. 210—350 **8 Claims**



1. Oil-water separation apparatus comprising a housing having an inlet and an outlet end; said inlet end having an inlet for introducing an oil-water fluid into the housing, said outlet end having an outlet for removing separated oil from the housing and an outlet for removing separated water from the housing; a pair of perforated plates axially spaced within the housing intermediate its ends, one of which is fixed in the housing and the other is movably mounted within the housing, said plates forming between them and with the inner wall surface of the housing a flowthrough separation chamber; porous filter material that is regenerable by compression located within the chamber; an envelope of flexible, impervious material surrounding the outer surface of the porous material adjacent the inner wall surface of the separation chamber, said envelope having an outer dimension less than the dimension of the inner wall surface of the chamber and being conducted at one end to said movable plate and at the other end adjacent the fixed plate to form an annular space around the enveloped porous material between the envelope and the inner wall surface of the chamber that can be pressurized with fluid in opposition to the pressure of flow of fluid through the chamber, said porous filter material being oversized in an uncompressed state with respect to said dimension of the envelope so that it is compressed into the envelope; and means for moving under pressure the movable plate with respect to the fixed plate so that the porous filter material and its surrounding envelope can be axially compressed within the chamber.

4,022,695

REMOVABLE FILTER CLOTH FOR A LEAF FILTER OF A PRESSURE VESSEL

Laurence M. Howard, Cresskill, N.J., and Robert Schaaf, Brooklyn, N.Y., assignors to Air Filters, Inc., Brooklyn, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,617

Int. Cl.² B01D *29/00*

U.S. Cl. 210—486 **4 Claims**

1. A filter cloth for a leaf of a pressure vessel having a filtrate outlet, said cloth comprising an enclosed retaining sack disposable over the leaf, said retaining sack being flat and of a substantially circular shape, said sack being fabricated from a single unitary one piece blank of a filtering medium, said blank having a pattern of two substantially identical circular portions integrally interconnected along an intermediate portion thereof, said intermediate portion being disposed on a perimeter edge of said sack, said sack including an outlet opening through which the filtrate outlet is extendable so that a filtered product can be extracted, said outlet opening being disposed in said intermediate portion at said edge and extending therethrough, reinforcing means surrounding said outlet opening to provide a seal about the filtrate outlet, said reinforcing means including a unitary section of reinforcing material secured to an outer surface of said intermediate portion of said sack, said unitary section having an aperture extending therethrough, said aperture being in axial alignment with said

outlet opening and being smaller than said outlet opening to provide a tight seal about the filtrate outlet, said sack including a vent hole positioned at a perimeter edge thereof in a diametrically opposed relationship with said outlet opening, releasable closure means disposed on said sack for opening said sack to install and remove it from the leaf, said closure means being located on a greater part of a semi-circular perimeter edge of said sack between said outlet opening and said vent hole, and means securely fastening together remaining mating perimeter edges of said circular portions other than said perimeter edges occupied by said outlet opening, said vent hole and said closure means.

4,022,696

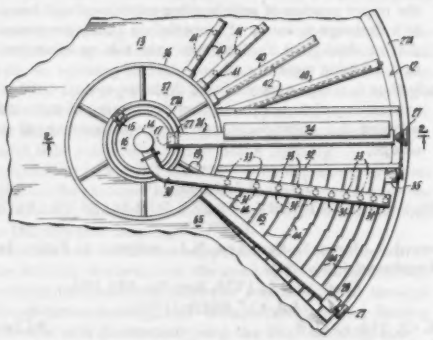
APPARATUS FOR CLARIFICATION OF WASTE WATER OPERATING ON DISSOLVED AIR FLOTATION PROCESS

Milos Krofta, 58 Yokun Ave., Lenox, Mass. 01240

Filed Mar. 24, 1976, Ser. No. 670,067

Int. Cl.² B01D *17/08*

U.S. Cl. 210—520 **15 Claims**



1. Apparatus for purifying unclarified water in the paper, pulp, and like industries comprising

a cylindrically shaped tank having an upwardly directed outer wall and a generally flat bottom,

an inlet pipe extending vertically through the center portion of said tank,

a cylindrically shaped sludge compartment positioned about said inlet pipe in the center portion of said tank and having an upwardly directed outer wall,

an outlet pipe for said sludge compartment, an outlet pipe for clarified water in said tank positioned outwardly of said sludge compartment,

means defining a sludge trough in the bottom of said tank, outlet means for said sludge trough,

a carriage supported radially of said tank between the upper edge of said tank wall and the upper edge of said sludge compartment wall for rotatable movement around the inside of said tank,

means for rotatable movement of said carriage,

a waste water distribution arm carried by said carriage radially of said tank and provided with a plurality of orifices,

sludge removal scooping means extending radially of said tank and carried by said carriage,

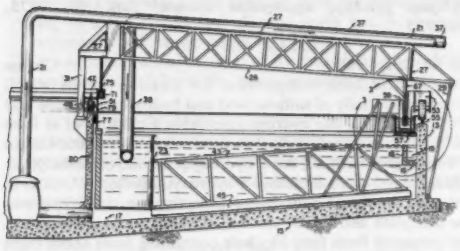
means for operation of said sludge removal scooping means, and

a clarified water inlet distributor carried by said carriage and having a cylindrical wall spaced outwardly of said sludge compartment in fluid communication with said clarified water outlet pipe.

4,022,697
SEALED SEDIMENTATION DEVICE

Peter Jerome Pankuch, Bountiful, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Mar. 6, 1975, Ser. No. 556,046
Int. Cl.² B01D *21/14*
U.S. Cl. 210—530 **8 Claims**



1. In an apparatus for separating solids from liquids by sedimentation, which apparatus includes a liquid-holding tank, means for maintaining a predetermined maximum liquid level in the tank, a support pier which stands centrally in the tank, a sediment-engaging raking structure supportively journaled to rotate about the pier, a stationary roof supported outside the periphery of the tank, and drive means which travel about the periphery of the tank to rotatably drive the raking structure, the improvement comprising:

a. an annular liquid-holding seal launder fixedly supported inward of the path of travel of said drive unit to surround the interior of the tank and to surround the means for maintaining a maximum liquid level in the tank;

b. a rigid U-shaped member fixedly connecting the drive means to the raking structure and arranged to travel continuously through the seal launder with its lower portion submerged in the liquid held in the launder; and

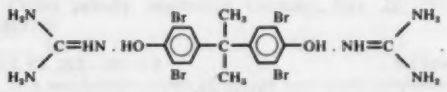
c. a continuous baffle-like wall supported by said roof to depend downwardly into the space bound by the submerged portion of said U-shaped member thereby to form a gas-tight seal between the roof and the tank to enable the drive means to travel outside the sealed enclosure.

4,022,698
BIS-(GUANIDINE)-TETRABROMODIAN AND ITS PRODUCTION

Herbert Jenkner, Cologne, Germany, assignor to Chemische Fabrik Kalk GmbH, Germany

Filed Feb. 5, 1976, Ser. No. 655,565
Claims priority, application Germany, Feb. 26, 1975, 2508188
Int. Cl.² C07C *129/00*; C09D *5/18*; C09K *3/28*
U.S. Cl. 252—8.1 **3 Claims**

1. A compound of the formula



4,022,699
SOLUBLE OIL COMPOSITION

LeRoy W. Holm, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation-in-part of Ser. No. 266,284, June 26, 1972, abandoned, which is a continuation-in-part of Ser. No. 889,640, Dec. 31, 1969, Pat. No. 3,697,424, which is a continuation-in-part of Ser. No. 713,496, March 15, 1968, Pat. No. 3,500,919. This application Nov. 22, 1974, Ser. No. 526,245
The portion of the term of this patent subsequent to Oct. 10, 1989, has been disclaimed.
Int. Cl.² E21B *43/22*; C09K *3/00*
U.S. Cl. 252—8.55 D **25 Claims**

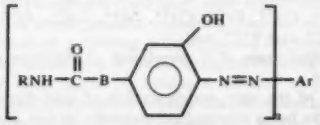
1. An oil-external soluble oil composition comprising 35 to 90 volume percent of a liquid hydrocarbon selected from the group consisting of crude petroleum and liquid fractions thereof; 0.5 to 8 volume percent of a stabilizing agent selected from the group consisting of unsubstituted saturated monohydric aliphatic alcohols having 3 to 5 carbon atoms, unsubstituted saturated dihydric aliphatic alcohols having 3 carbon atoms, unsubstituted saturated aliphatic ketones having 4 to 6 carbon atoms, unsubstituted saturated glycol ethers having 4 to 12 carbon atoms, and dialkylene glycols having 6 carbon atoms; and 4 to 30 volume percent of surface active agents comprising both preferentially oil-soluble alkyl aryl sulfonates and preferentially water-soluble alkyl aryl sulfonates, said sulfonates being present in the proportion of about 1 to 15 parts of preferentially oil-soluble sulfonates per part of said preferentially water-soluble sulfonates; said soluble oil exhibiting a maximum viscosity upon the addition of water thereto not greater than about five times the viscosity of the soluble oil in a substantially anhydrous condition.

4,022,700
ORGANIC GREASE THICKENING AGENTS

Howard A. Harris, New York, N.Y., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 3, 1976, Ser. No. 663,426
Int. Cl.² C10M *1/32, 3/26, 5/20, 7/30*
U.S. Cl. 252—51.5 A **7 Claims**

1. A grease composition consisting essentially of a major amount of a lubricating oil base vehicle and in an amount sufficient to thicken the base vehicle to grease consistency, an azoaryl compound of the formula:



wherein R is an aliphatic hydrocarbyl radical of 16 to 22 carbon atoms, B is nitrogen or oxygen and Ar is an arylene radical selected from the class consisting of phenylene, naphthylene and diphenylene, said arylene radical being either unsubstituted or substituted on each aromatic ring with an aliphatic hydrocarbyl radical of 1 to 4 carbon atoms.

4,022,701

HIGH-PERFORMANCE ANISOTROPIC PLASTICS MAGNET AND A PROCESS FOR PRODUCING THE SAME

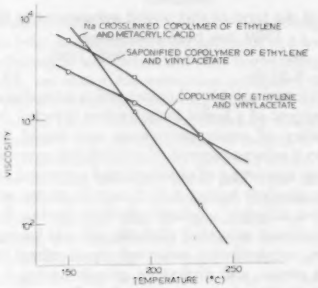
Shigeki Sawa; Takeshi Anbo, both of Tokyo; Kiyoshi Otani, and Yoshikazu Kutsuwa, both of Ichihara, all of Japan, assignors to Japan Special Steel Co., Ltd. and Mitsui Polychemicals, Co., Ltd., both of Tokyo, Japan

Filed Apr. 28, 1975, Ser. No. 572,293

Claims priority, application Japan, Apr. 26, 1974, 49-49263

Int. Cl.² H01F *1/00, 1/26*

U.S. Cl. 252—62.54 **6 Claims**



1. An anisotropic plastics magnet having a maximum energy product of at least 0.9 MGOe, a remanence of at least 2000 G and a coercive force of at least 1800 Oe, said magnet being comprised of:

at least one ferromagnetic powder having a large magnetic anisotropy selected from the group consisting of:

$MO.6Fe_2O_3$ ferrite magnet powders, wherein M is selected from the group consisting of Ba, Sr and Pb,

RCo_5 rare earth-cobalt magnet powders wherein R is at least one rate earth element selected from the group consisting of Sm, Pr, Ce, La and Y,

manganese-bismuth magnet powders, and

manganese-aluminum magnet powders; and

at least one resin selected from the group consisting of:

metal-cross-linked copolymers of α-olefin and α,β-unsaturated mono- or dicarboxylic acid selected from the group consisting of: ethylene-acrylic acid copolymer, ethylene-metacrylic acid copolymer, ethylene-acrylic acid-metacrylic acid copolymer, ethylene-acrylic acid-methacrylic acid methyl ester copolymer and ethylene-metacrylic acid-acrylic acid methyl ester copolymer, with said metal ion selected from the group consisting of: Na^+, K^+, Li^+, Cn^+, Be^{++}, Mg^{++}, Ca^{++}, Ba^{++}, Cu^{++}, Fe^{++}, Co^{++}, Ni^{++}, Zn^{++}, Al^{+++}, Sc^{+++}, Fe^{+++} and Y^{+++}, and

a saponified resin of a copolymer of ethylene and vinyl acetate,

the axis of the easy magnetization of said ferromagnetic powders being oriented substantially in one direction.

4,022,702

PRODUCTION OF DETERGENT COMPOSITIONS CONTAINING CALCIUM CARBONATE

Michael Curtis, Heswall, England, assignor to Lever Brothers Company, New York, N.Y.

Filed May 28, 1975, Ser. No. 581,409

Claims priority, application United Kingdom, May 30, 1974, 23949/74

Int. Cl.² C11D *3/10, 3/12, 11/02, 13/01*

U.S. Cl. 252—89 R **5 Claims**

1. In a process for making a particulate detergent composition comprising from about 5 to about 40% of a detergent surface active compound selected from the group consisting of an anionic active which does not form an insoluble calcium salt during use, an amphoteric active, a zwitterionic active and mixtures thereof; from about 10 to about 75% of an alkali metal carbonate detergency builder; and from about 5 to about 60% of finely divided calcium carbonate having a surface area of at least about $5m^2/g$, the percentages being by weight of the total composition, the improvement whereby the calcium carbonate is dispersed in water to which from 5 to 100% of the detergent surface active compound is added, this percentage being by weight of the total detergent active compound in on the resultant composition, after which the alkali metal carbonate is added to form a detergent slurry which is then spray dried to form the detergent composition.

4,022,703

STABILIZATION OF HYDROGEN PEROXIDE IN ACID BATHS FOR CLEANING METALS

Michel Bakes, Saint Cloud, and Michel Roche, Roubaix, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Jan. 13, 1976, Ser. No. 649,131

Claims priority, application France, Jan. 14, 1975, 75.00923

Int. Cl.² C11D *7/60*

U.S. Cl. 252—100 **5 Claims**

1. An acid bath composition for pickling metals which consists essentially of sulfuric acid and hydrogen peroxide and as a stabilizer for the hydrogen peroxide a mixture of at least one 8-hydroxyquinoline derivative which is the neutral sulfate of 8-hydroxyquinoline, the 8-hydroxyquinoline of phthalylsulfathiazole, 5-sulfo-6-methyl-8-hydroxyquinoline, 5-nitro-8-hydroxyquinoline, 5-sulfo-8-hydroxyquinoline, or 8-oxyquinoline salicylate and a fatty alcohol-ethylene oxide polycondensate prepared from fatty alcohols containing from about eight to about twenty carbon atoms condensed with from about two to about fifty moles of ethylene oxide, the amount of the stabilizer being effective to protect the peroxide from decomposition due to impurities in the bath.

4,022,704

PRODUCTION OF SPRAY DRIED, HIGH BULK DENSITY HYDROUS SODIUM SILICATE MIXTURES

Wayne J. Balfanz, New City, N.Y., and Joseph S. Steinreich, Olympia Fields, Ill., assignors to Stauffer Chemical Company, Westport, Conn.

Filed June 21, 1971, Ser. No. 155,346

Int. Cl.² B01D *1/16;* **C11D** *7/14, 11/02*

U.S. Cl. 252—135 **15 Claims**

1. In a process for spray drying an aqueous sodium silicate composition consisting essentially of from about 10 to about 55 percent by weight of sodium silicate having an SiO_2:Na_2O ratio of from about 1:1 to 3.4:1 by dispersing the aqueous sodium silicate composition in the form of droplets into a heated gas stream and contacting the droplets with the heated gas stream for a sufficient length of time to form a dry, hydrous, powdered sodium silicate composition having a bulk density of at least about 0.64 gms/cc., and containing from 50 to about 95 percent by weight of the solids in the dry powdery hydrous sodium silicate composition of sodium silicate, the

improvement which comprises: admixing with the aqueous sodium silicate from about 5 percent to 100 percent by weight of the sodium silicate of at least one additive selected from the group consisting of alkali metal carbonates, sesquicarbonate, sulfates, chlorides, borates and tripolyphosphates whereby the inlet gas temperature of the spray dryer can be increased and the capacity of the spray dryer for producing dry, powdery, hydrous sodium silicate having a bulk density from about 0.64 to about 0.80 gms/cc. is increased.

4,022,705

GAS GENERATING COMPOSITIONS

Werner F. Beckert, Las Vegas, Nev.; William H. Barber, Brandywine, Md., and Ottmar H. Dengel, Front Royal, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 27, 1975, Ser. No. 562,716

Int. Cl.² C09K *3/00*

U.S. Cl. 252—188.3 R **24 Claims**

1. A composition capable of generating a gas selected from the group consisting of gaseous hydrocarbons and hydrogen isotopes and mixtures thereof,

said composition comprising the intimate mixture of at least one ammonium compound having the general formula $(NR^{I}R^{II}R^{III}R^{IV})_nX$ wherein R^{I} to R^{IV} are the same or different and are selected from the group consisting of a hydrocarbon radical and a hydrogen isotope radical, with the proviso that at least one R group is a hydrocarbon radical;

X is an inorganic or organic acid group and *n* is the valency of said acid group;

and at least one hydride compound having the general formula $Y(ZQ^{I}Q^{II}Q^{III}Q^{IV})_m$;

wherein Y is a mono- or divalent metal capable of forming complex hydrides and is selected from the group consisting of alkali metals and alkaline earth metals, *m* is the valency of said mono- or divalent metal;

Z is a trivalent metal capable of forming complex hydrides and is selected from the group consisting of boron and aluminum and

Q^{I} to Q^{IV} are the same or different hydrogen isotopes, wherein said compounds are present in about stoichiometric amounts or are present in amounts such that there is a stoichiometric excess of one or more of the compounds.

4,022,706

CHOLESTERIC LIQUID CRYSTAL WATER BASE INK AND LAMINATES FORMED THEREFROM

Frederick Davis, Dublin, Calif., assignor to Robert Parker Research, Inc., Dublin, Calif.

Continuation-in-part of Ser. No. 425,006, Dec. 17, 1973, Pat. No. 3,969,264. This application Oct. 31, 1974, Ser. No. 519,480

The portion of the term of this patent subsequent to July 13, 1993, has been disclaimed.

Int. Cl.² G01K *11/16;* **C09K** *3/34*

U.S. Cl. 252—299 **18 Claims**

1. A composition useful in the formation of liquid crystal films which comprises:

a thick oil in water emulsion having from 30 to 80 weight percent solids of which 25–80 weight percent is a cholesteric liquid crystal composition and 75–20 weight percent respectively is a transparent latex forming polymer;

from 20–70 weight percent liquid having water in from 40–75 weight percent and a moderately water soluble oxygenated organic solvent having a boiling point less than about 175° C for said liquid crystal composition in from 25–60 weight percent; and

a small but sufficient amount of a thickening agent to provide the desired viscosity for film forming.

13. A laminate comprising a thin transparent film, having as one layer a film of at least about 0.5 mil thickness prepared from a composition according to claim **1** and as a second layer a black pigmented film backing.

4,022,707

ATHERMAL LASER GLASS

Otto Deutschbein, Montrouge, France; Marga Faulstich, Darmstadt, Germany; Norbert Neuroth, Darmstadt, Germany, and Walter Jahn, Darmstadt, Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed Nov. 17, 1975, Ser. No. 632,848

Claims priority, application Germany, Nov. 25, 1974, 2455728

Int. Cl.² C09K *11/42, 11/46;* **C03C** *3/16, 3/28*

U.S. Cl. 252—301.6 P **8 Claims**

1. A neodymium-doped phosphate laser glass composition having a low threshold for stimulated emission and a negative coefficient of the refractive index, comprising from about 65 to about 83% by weight of P_2O_5; from about 7 to about 17% by weight of Na_2O, K_2O or mixtures thereof; from about 4 to about 15% by weight of Al_2O_3; up to about 8% by weight of an oxide RO, wherein R is Mg, Ba, Ca, Sr or Zn; up to about 2% by weight of F; and from about 0.5 to about 15% by weight of Nd_2O_3 and the molar ratio of Na_2O or K_2O: P_2O_5 is between 0.25 and 0.5.

4,022,708

METHOD OF PREPARATION FOR STORAGE OF LIQUIDS USED IN THE REPROCESSING OF SPENT NUCLEAR FISSILE AND/OR FERTILE MATERIALS

Stefan Drobnik, Blankenloch, Germany, assignor to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed July 31, 1973, Ser. No. 384,172

Claims priority, application Germany, Aug. 5, 1972, 2238694

Int. Cl.² G21F *9/20, 9/24*

U.S. Cl. 252—301.1 W **27 Claims**

1. Method of preparing a waste liquid for non-polluting storage and recovering a useful component from the waste liquid, the waste liquid containing a solution of phosphoric acid ester and hydrocarbon used in the reprocessing of spent nuclear fissile and/or fertile materials and further containing at least one impurity in the form of radioactive materials or decomposition products, comprising:

a. adding concentrated phosphoric acid to the waste liquid at room temperature in a quantity corresponding to a molar ratio of H_3PO_4 to phosphoric acid ester of 2:1, relative to the phosphoric acid ester content of the waste liquid, to form a lighter phase containing hydrocarbon and a heavier phase containing the phosphoric acid and impurity;

b. separating the heavier phase containing the phosphoric acid and impurity from the lighter phase containing hydrocarbon;

c. washing the lighter phase containing hydrocarbon with an aqueous sodium oxalate washing solution;

d. treating the washed lighter phase with active charcoal to obtain a decontamination factor for the treated washed lighter phase of about 10^5 to 10^6 with respect to the waste liquid of step (a);

e. recycling the hydrocarbon obtained in step (d) by adding phosphoric acid ester to the hydrocarbon to form a fresh solution of hydrocarbon and phosphoric acid ester to be used in the reprocessing; and

f. treating the separated heavier phase of step (b) containing the phosphoric acid ester and impurity to form a solidified waste product containing radioactive material.

19. Method of preparing a waste liquid for non-polluting storage and recovering a useful component from the waste liquid, the waste liquid containing a solution of phosphoric acid ester and hydrocarbon used in the reprocessing of spent nuclear fissile and/or fertile materials and further containing

at least one impurity in the form of radioactive materials or decomposition products, comprising:

a. adding a 50% caustic soda solution to the waste liquid in a quantity corresponding to a molar ratio of NaOH to phosphoric acid ester of 3:1, relative to the phosphoric acid ester content of the waste liquid, to form a saponified waste liquid containing an azeotropic mixture;

b. removing the azeotropic mixture from the remainder of the saponified waste liquid during the saponification process to form a reaction mixture;

c. cooling the reaction mixture after completion of the saponification;

d. diluting the cooled reaction mixture with water to form an organic phase containing hydrocarbon and an aqueous phase containing phosphate and impurity;

e. separating the organic phase containing hydrocarbon from the aqueous phase containing phosphate and impurity;

f. washing the separating organic phase of step (e) containing hydrocarbon with concentrated phosphoric acid to purify it and obtain a washed and separated organic phase with a decontamination factor of about 10^5 to 10^6 with respect to the waste liquid of step (a);

g. recycling the purified hydrocarbon of step (f) by adding phosphoric acid ester to the hydrocarbon to form a fresh solution of hydrocarbon and phosphoric acid to be used in the reprocessing; and

h. treating the separated aqueous phase of step (e) containing phosphate and impurity to form a solidified waste product containing radioactive material.

4,022,709
PHOSPHORESCENT MATERIALS

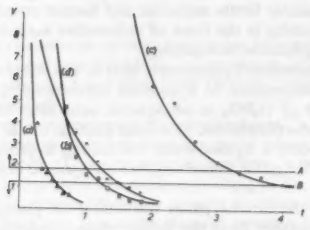
Berkeley Michael Ferro, Barnehurst; Rodney Edwin Spratling, Sittingbourne, and Aubrey Douglas Walker, North Harrow, all of England, assignors to The Post Office, London, England

Filed Jan. 22, 1975, Ser. No. 543,154

Claims priority, application United Kingdom, Jan. 25, 1974, 3478/74

Int. Cl.² C09K *11/00*; C09D *11/00*

U.S. Cl. 252—301.35 **28 Claims**



1. A composition consisting essentially of an aqueous solution, having a pH within the range of from 6 to 9.5 of a phosphorescence activator and a soluble precondensate obtained by a reaction between formaldehyde and an amino compound, the soluble precondensate being capable of further reaction in the absence of the phosphorescence activator whereby there is formable an insoluble condensation product that does not substantially absorb ultraviolet radiation at any wavelength at which the phosphorescence activator substantially absorbs ultraviolet radiation, and being capable of such further reaction in the presence of the phosphorescence activator whereby there is formed a phosphorescent insoluble condensation product.

16. A printing ink composition consisting essentially of an aqueous solution of a phosphorescence activator and a soluble precondensate obtained by reacting formaldehyde with a molar excess of an amino compound, which soluble precondensate is capable of further reaction in the presence of the phosphorescence activator whereby there is formable a phosphorescent insoluble condensation product that does not substantially absorb ultraviolet radiation at any wavelength at which the phosphorescence activator absorbs ultraviolet radiation.

28. A paper-coating composition which comprises (a) an aqueous coating mix of pigment and binder and (b) an aqueous solution, having a pH within the range of from 6 to 8, of a phosphorescence activator and a soluble precondensate of formaldehyde and an amino compound, which soluble precondensate is capable of further reaction in the presence of the phosphorescence activator whereby there is formable a phosphorescent insoluble condensation product that does not substantially absorb ultraviolet radiation at any wavelength at which the phosphorescence activator substantially absorbs ultraviolet radiation.

4,022,710
PROCESS FOR PRODUCING COLLOIDAL ANTIMONY OXIDE

Toshiyuki Kobashi, and Hirotaka Shiota, both of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed May 10, 1976, Ser. No. 684,739

Claims priority, application Japan, May 21, 1975, 50-61349

Int. Cl.² B01J *13/00*

U.S. Cl. 252—313 R **14 Claims**

1. A process for producing colloidal antimony oxide characterized by reacting an aqueous dispersion obtained by dispersing antimony trioxide and hydrogen peroxide in a ratio of 1 mol of the former to 2 mols or more of the latter into water, while passing said dispersion in the form of a plug flow through a tubular reactor having a shape represented by the formula: $l/D \geqq 2000$ wherein l stands for the length of the tube and D stands for the inner diameter of the tube, said aqueous dispersion having a residence time of from about 1 to 30 minutes and being maintained at a temperature of not lower than 90° C within said tubular reactor.

4,022,711
CATALYZED HYDRAZINE COMPOUND CORROSION INHIBITING COMPOSITION CONTAINING A COMPLEX OF METAL SALT AND AMINO DERIVATIVE OF CARBOXYLIC ACID, AND A QUINONE COMPOUND

Manfred G. Noack, Northford, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Feb. 24, 1976, Ser. No. 660,807

Int. Cl.² C23F *11/14*, *11/18*

U.S. Cl. 252—389 R **32 Claims**

1. A composition, comprising:

a. a hydrazine compound:

b. about 0.002 parts to about 0.04 parts by weight of an organometallic complex per part of hydrazine compound, said organometallic complex being the reaction product of:

i. an inorganic salt selected from the group consisting of cobaltous, manganous, and cupric salts; and

ii. at least one organic ligand selected from the group consisting of unsubstituted amino derivatives of carboxylic acids, substituted amino derivatives of carboxylic acids wherein the substituents are inert and salts of said unsubstituted and substituted derivatives; and

c. about 0.001 parts to about 0.05 parts by weight of a quinone compound per part of hydrazine compound.

4,022,712

CATALYZED HYDRAZINE COMPOUND CORROSION INHIBITING COMPOSITION CONTAINING COMPLEX OF METAL SALT AND AMINO DERIVATIVE OF CARBOXYLIC ACID, AND ITS USE

Manfred G. Noack, Northford, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Feb. 24, 1976, Ser. No. 660,808
Int. Cl.² C23F *11/14, 11/18*
U.S. Cl. 252—389 R 30 Claims

1. A composition, comprising:

a. a hydrazine compound; and

b. about 0.002 parts to about 0.04 parts by weight of an organometallic complex per part of hydrazine compound, said organometallic complex being the reaction product of:

i. an inorganic salt selected from the group consisting of cobaltous, manganous, and cupric salts; and

ii. at least one organic ligand selected from the group consisting of unsubstituted amino derivatives of carboxylic acids, substituted amino derivatives of carboxylic acids wherein the substituents are inert and salts of said unsubstituted and substituted derivatives.

4,022,713

COMPOSITIONS CONTAINING MONOALKANOLAMIDE BORATES

David A. Waldstein, 622 Bergen Ave., Jersey City, N.J. 07108

Division of Ser. No. 450,565, March 13, 1974, Pat. No. 3,969,236. This application Apr. 7, 1976, Ser. No. 674,321
Int. Cl.² C23F *11/14*
U.S. Cl. 252—389 R 2 Claims

1. A composition comprising a liquid carrier constituting water and a rust-inhibiting-effective amount of an alkanolamide borate which is the reaction product of orthoboric acid and a primary alkanolamine selected from the group consisting of monoethanolamine, monomethanolamine, 1-isopropanolamine, mono-n-propanolamine and 2-amino-2-methyl-propanolamine in a ratio of 1 gram mole of boric acid to 1 to 2 gram moles of alkanolamide, the reaction taking place in a closed reactor for about 4 to 5 hours at a temperature between about 130° to about 165° C with the water formed being removed during the reaction.

4,022,714

SILICA HYDROSOL BOUND CRACKING CATALYSTS

Curtis Homer Elliott, Jr., Baltimore, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed July 17, 1975, Ser. No. 596,922
The portion of the term of this patent subsequent to Feb. 18, 1992, has been disclaimed.
Int. Cl.² B01J *29/06, 21/02*
U.S. Cl. 252—455 Z 12 Claims

1. A process for preparing a hydrocarbon cracking catalyst which comprises:

a. preparing a silica hydrosol by decreasing the pH of a sodium silicate solution to about 2.0 to 3.2,

b. adding from about 0.1 to 10 percent based on the hydrosol silica content of a precursor of an oxide of titanium, zirconium, iron, boron or quadrivalent cerium and mixtures thereof thereto,

c. adding clay before, during, or after hydrosol formation,

d. preparing a water slurry of crystalline zeolitic aluminosilicate and adjusting the pH to about 3 to 4.5,

e. mixing said zeolite slurry with the modified silica hydrosol clay slurry prepared in step (b) to prepare a spray drier feed slurry having a pH of 2.8 to 3.5,

f. spray drying, before gellation occurs,

g. washing, drying and recovering the product.

4,022,715

PROCESS FOR CATALYST MATERIALS OF INCREASED PORE VOLUME AND PORE DIAMETER

Robert Alan Bornfriend, Ridgefield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,579
Int. Cl.² B01J *21/04*
U.S. Cl. 252—463 9 Claims

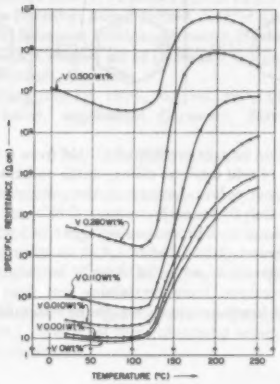
1. A process for producing a molded catalyst material of increased porosity which comprises: (1) preparing a moldable aqueous dispersion of an inorganic oxide gel; (2) uniformly incorporating in said dispersion an effective amount of a compound which undergoes decomposition with the liberation of gas at a decomposition temperature above the boiling point of water at atmospheric pressure; (3) molding the resultant composition to form a desired structure; and (4) thereafter heating said structure to a temperature above said decomposition temperature so as to liberate said gas while setting the structure formed.

4,022,716

SEMICONDUCTING CERAMICS CONTAINING VANADIUM OXIDE

Hisayoshi Ueoka, Ichikawa, and Masatada Yodogawa, Tokyo, both of Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 355,199, April, 27, 1973, abandoned. This application Feb. 17, 1976, Ser. No. 658,720
Int. Cl.² H01B *1/08*
U.S. Cl. 252—520 5 Claims



1. A fired barium titate ceramic semicondutor composition containing:

barium titanate;

at least one semiconductor activator selected from the group consisting of rare earth elements, Sb, Bi, Nb and Ta; and

vanadium oxide in the amount of about 0.001 to 0.5 percent V by weight, based on $BaTiO_3$, said vandium having a valence of no greater than 4.

4,022,717

MOLYBDENUM CATALYZED OXIDATIVE COUPLING POLYMERIZATION OF ARENES IN LIQUID HYDROGEN FLUORIDE

Robert Alton Clement, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 24, 1974, Ser. No. 482,575
Int. Cl.² C08G *61/10*
U.S. Cl. 260—2 H 9 Claims

1. A process for the oxidative coupling of arenes to polymer, which comprises contacting and reacting at least one

arene, in liquid hydrogen fluoride, with oxygen in the presence of a catalytic amount of up to about 0.25 mole of a molybdenum compound soluble in the reaction medium per mole of arene other than benzene; at a temperature between 0° and 120° C, with the proviso that at least 1/30 of the total arene is at least one arene having at least 10 carbon atoms.

4,022,718

HIGH RESILIENCE FIRE RETARDANT URETHANE FOAM

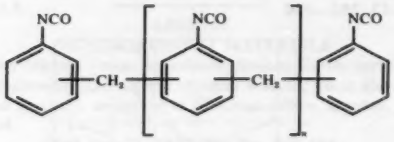
Robert Victor Russo, Brooklyn, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Mar. 6, 1974, Ser. No. 448,517

Int. Cl.² C08G *18/32, 18/14*

U.S. Cl. 260—2.5 AM **24 Claims**

1. In the process of producing a cold cured, stable, fire retardant, high resilience polyether urethane foam having a sag factor of at least 2.2 by reaction of an unhalogenated polyether polyol and, as an organic isocyanate reactant, tolylene diisocyanate or polymethylene polyphenyl polyisocyanate of the formula:



wherein *n* is an integer predominantly of from 0 to 1 inclusive, or mixtures of said tolylene diisocyanate and said polymethylene polyphenyl polyisocyanate, in the presence of a blowing agent and catalyst; the improvement that comprises incorporating therein as a chain-extending agent and additional reactant, 2,3-dibromo-2-butenediol-1,4 in an amount by weight of said unhalogenated polyol of 3 to 9 percent; the resulting polyether urethane foam containing less than 5 percent of polymerized isocyanurate by weight of reactant isocyanate.

4,022,719

PROCESS FOR PRODUCING POLYAMIDE FOAM

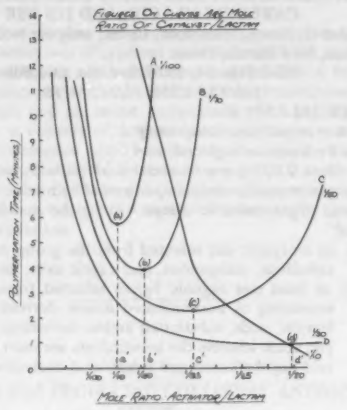
Toru Okuyama; Susumu Muta; Suminobu Kurahashi, all of Yokohama, and Shigetake Sato, Kamakura, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Continuation of Ser. No. 451,189, March 11, 1974, abandoned, which is a continuation of Ser. No. 415,402, Nov. 13, 1973, abandoned, which is a continuation-in-part of Ser. No. 305,667, Nov. 13, 1972, abandoned. This application May 12, 1975, Ser. No. 576,321

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 N **4 Claims**

1. A process for producing a polyamide foam which comprises polymerizing a mixture of (1) ε-caprolactam, dodecanolactam, or a mixture thereof at a temperature of from 120° to 160° C, (2) sodium lactam as catalyst and (3) an activator selected from the group consisting of hexamethylene diisocyanate, m-xylylene diisocyanate and hydrogenated diphenylemethane-4,4′-diisocyanate, the molar ratio of catalyst/lactam being in the range of from 1/10 to 1/200 and the molar



ratio of activator/catalyst being in the range of from 0.5/1 to 2.5/1.

4,022,720

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAMS

Johannes Blahak, Cologne, and Hans-Joachim Meiners, Leverkusen-Schlebusch, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

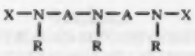
Filed May 21, 1975, Ser. No. 579,522

Claims priority, application Germany, May 25, 1974, 2425448

Int. Cl.² C07C *97/02*; C08G *18/18*

U.S. Cl. 260—2.5 AC **10 Claims**

1. In a process for the production of polyurethane foams comprising reacting an organic compound containing at least two active hydrogen atoms with an organic polyisocyanate and water and/or organic blowing agents, in the presence of catalysts containing tertiary nitrogen atoms and optionally in the presence of other foam additives, the improvement wherein the catalysts used are polyacyl compounds corresponding to the general formula:



wherein

A represents a C_1–C_6 alkylene group;

R represents a C_1–C_5 alkyl group;

X represents an acyl group.

4,022,721

PROCESS FOR PRODUCING COMPOUNDS HAVING AN OXAZOLIDONE RING USING A COMPLEX OF ALUMINUM HALIDE CATALYST

Kaneyoshi Ashida, Chofu, Japan, assignor to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Sept. 15, 1975, Ser. No. 613,175

Claims priority, application Japan, Sept. 26, 1974, 49-110727; Sept. 27, 1974, 49-111173; Sept. 27, 1974, 49-111174

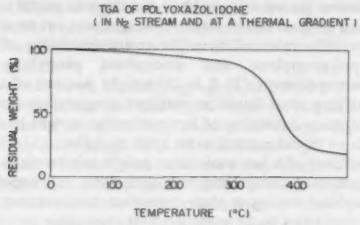
Int. Cl.² C08G *18/00, 18/16*

U.S. Cl. 260—2.5 AC **27 Claims**

1. A process for the production of a compound having an oxazolidone ring comprising reacting an isocyanate compound and epoxy compound in the presence of a catalyst of a complex of an aluminum halide with at least one Lewis base selected from the group consisting of an ether, a thioether, an

amine, a lactam, an N-alkyl lactam, an amide, an N-alkyl amide, a phoshorus compound represented by formulae (1) ad (2) and a sulfur compound represented by formula (3):

1. R^1_3P, wherein each R^1 may be the same or different and repesents hydrogen and hydrocarbon with the proviso that all are not hydrogen at the same time, and when two or more are hydrocarbons they may be combined to form alkylene,



2. R^2_3PO, wherein each R^2 may be the same or different and represents an alkyl, cycloalkyl, aryl, alkoxy, or acyl group which may be substituted with an alkoxy, an acyloxy or a halogen group, and
3. R^3_2SO, wherein each R^3 may be the same or different and represents a hydrocarbon.

4,022,722

PROCESS FOR PREPARING SHAPED, FOAMED POLYURETHANE ARTICLES

Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 483,660, June 27, 1974, Pat. No. 3,947,386, which is a division of Ser. No. 212,729, Dec. 27, 1971, Pat. No. 3,836,560, which is a continuation-in-part of Ser. No. 122,164, March 8, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 644,841

Int. Cl.² C08G *18/14;* **B32B** *5/20;* **B29D** *27/00*

U.S. Cl. 260—2.5 AH **15 Claims**

1. A process for preparing a shaped, foamed polyurethane article comprising shaping a curable froth which is substantially structurally stable but workable at ambient temperatures, said froth comprising

a. an organic polyisocyanate;

b. an active hydrogen compound reactive with said polyisocyanate to form a polyurethane;

c. a high molecular weight linear non-hydrolyzable $(AB)_n$ siloxane-polyoxyalkylene block copolymer having the average formula

$$(Y(R_xSiO)_aR_ySiYO(C_nH_{2n}O)_x)_d$$

wherein R represents a monovalent hydrocarbon radical free from aliphatic unsaturation; n is an integer of from 2 to 4 inclusive; a is an integer of at least 6; y is an integer of at least 4; d is an integer of at least 4; Y represents a divalent organic group selected from the class consisting of —R′—, —R′CO— —R′—NHCO—, —R′—NCHONH—R″—NHCO— and —R′—OOCH—R″—NHCO—wherein R′ is a divalent alkylene radical and R″ is R′ or a divalent arylene group; wherein the average molecular weight of each siloxane block ranges from about 500 to about 10,000; wherein the average molecular weight of each polyoxyalkylene block ranges from about 300 to about 10,000; wherein the siloxane blocks constitute about 20 to about 50 weight percent of the copolymer; wherein the polyoxyalkylene blocks constitute about 80 to about 50 weight percent of the copolymer; and wherein the block copolymer has an average weight of at least about 30,000; and

d. an inert normally gaseous gas substantially uniformally dispersed throughout said froth; and maintaining the resultant shaped froth at a temperature sufficeint to cure it and set its shape.

4,022,723

PRESSURE-SENSITIVE ADHESIVE COMPOSITIONS

Takeo Hokama, Chicago, Ill., and Frank Scardiglia, Woodcliff Lake, N.J., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 14, 1975, Ser. No. 567,470

Int. Cl.² C08F *10/10;* **C08L** *7/00*

U.S. Cl. 260—4 AR **5 Claims**

1. A pressure-sensitive adhesive composition comprising from about 20 to about 80 weight percent tackifier consisting essentially of a solid, homogeneous and essentially random terpolymer of styrene, isobutylene and beta-pinene having a number average molecular weight of from about 1500 to about 7000, a styrene content of from about 40 to about 60 weight percent, an isobutylene content of from about 10 to about 40 weight percent, a beta-pinene content of from about 10 to about 40 weight percent and a ring and ball softening point of from about 160° to about 240° F, and from about 20 to about 80 weight percent elastomer.

4,022,724

NITROCELLULOSE ALKYD RESIN LACQUERS CONTAINING BIS-(HYDROXYPHENYL)-ALKANES

Hans Joachim Kreuder; Bernd Peltzer, both of Krefeld; Johannes Beckers, Kempen; Wolfgang Kremer, Krefeld, and Theo Kempermann, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed July 18, 1975, Ser. No. 597,169

Claims priority, application Germany, July 24, 1974, 2435511

Int. Cl.² C08L *1/18*

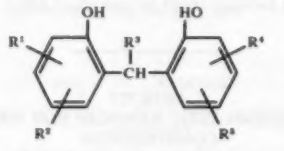
U.S. Cl. 260—16 **3 Claims**

1. A non-lifting lacquer containing

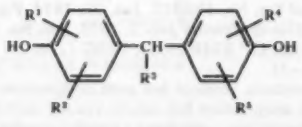
A. from 20 to 80% by weight of an alkyd resin;

B. from 80 to 20% by weight of a cellulose nitric acid ester, said % by weights of (A) and (B) being based on the sum of the weights of (A) and (B) in said non-lifting lacquer and

C. from 0.05 to 4% by weight, based on the weight of component (A), of at least one compound selected from the group consisting of



and



wherein R^1, R^2, R^4 and R^5 are the same or different and are each alkyl having 1 to 6 carbon atoms or an optionally substituted cycloaliphatic radial having 5 to 7 carbon atoms and R^3 is alkyl having 1 to 6 carbon atoms, an optionally substituted cycloaliphatic radical having 5 to 7 carbon atoms or hydrogen.

4,022,725

CONDENSED OLIGOMERIC ORGANO METALLIC RESINOUS ACYLATES CONTAINING LIGANDS OF MONOBASIC CARBOXYLIC ACID OF AT LEAST 7 CARBON ATOMS AND BRIDGING RADICALS OF DIVALENT CARBOXYLIC ACIDS OF AT LEAST 6 CARBON ATOMS AND PROCESSES FOR PRODUCING SUCH RESINS

Jacobus Rinse, East Dorset, Vt., assignor to MOACO Metal Oxide Acylates Company, Laussanne, Switzerland

Continuation-in-part of Ser. No. 312,264, Dec. 4, 1972, and a continuation-in-part of Ser. No. 77,341, Oct. 1, 1970, abandoned, which is a continuation-in-part of Ser. No. 840,604, July 7, 1969, Pat. No. 3,634,476. This application Apr. 1, 1975, Ser. No. 564,040

Int. Cl.² C08L *85/00*

U.S. Cl. 260—18 R **16 Claims**

1. An oligomeric resin which is a divalent metal acylate of the formula:

X M D M X

wherein:

each X is an acyloxy ligand of a monobasic acid containing at least 7 carbon atoms;

D is a diacyloxy ligand of a dibasic acid containing at least 8 carbon atoms; and

M is a divalent metal atom other than calcium.

4,022,726

STOVING LACQUER SYSTEMS HAVING A HIGH SOLIDS CONTENT AND COMPRISING AN ϵ-CAPROLACTONE

Karl Zabrocki, Buettgen; Rolf Dhein, Krefeld; Rolf Küchenmeister, Krefeld, and Wolfgang Beer, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed July 8, 1975, Ser. No. 594,108

Claims priority, application Germany, July 12, 1974, 2433489

Int. Cl.² C09D *3/52, 3/66*

U.S. Cl. 260—21 **4 Claims**

1. A stoving lacquer which comprises

A. 65 to 85% by weight of a binder, based on the combined weight of (A) and (B) and

B. 35 to 15% by weight of an aminoplast resin, based on the combined weight of (A) and (B), said binder consisting of

i. 75 to 95% by weight of a polyester having a molecular weight between 600 and 5,000 and containing hydroxyl and carboxyl groups and

ii. 25 to 5% by weight of an ϵ-caprolactone or of an ϵ-caprolactone in admixture with up to 50 mol % by weight of a polyhydroxyl compound having a molecular weight between about 66 and about 600.

4,022,727

THERMOPLASTIC RESINOID HOT MELT COMPOSITIONS

Fred B. Speyer, Euclid, Ohio, assignor to TRW Inc., Cleveland, Ohio

Division of Ser. No. 436,512, Jan. 25, 1974, Pat. No. 3,921,343. This application July 2, 1975, Ser. No. 592,462

Int. Cl.² B24B *19/14;* **C08G** *12/40*

U.S. Cl. 260—21 **3 Claims**

1. a thermoplastic resinoid hot melt composition which is rigid at room temperature but can be readily melt-flowed at elevated temperatures, comprising a reaction product consisting essentially of a methylolurea having a formaldehyde to urea mol ratio of 1:2 to 3:1 with at least one fatty acid containing from 12 to 20 carbon atoms per molecule, there being from 20 to 100 parts by weight of fatty acid for every 10 to 30 parts formaldehyde.

4,022,728

HOT MELT PRESSURE SENSITIVE ADHESIVES

Jimmy R. Trotter, and Frederick D. Petke, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 10, 1975, Ser. No. 585,639

Int. Cl.² C08L *23/12, 23/14*

U.S. Cl. 260—27 R **8 Claims**

1. An adhesive composition capable of being used as a hot melt adhesive for securing rubber members to metal surfaces comprising a blend of (1) 40 to 70 weight percent amorphous polyalphaolefin selected from the group consisting of amorphous polypropylene and amorphous propylene-alpha-mololefin copolymer, (2) 5 to 30 weight percent of at least one tackifying resin liquid at ambient temperatures selected from the group consisting of low molecular weight hydrocarbon resin or liquid natural ester resin tackifier, (3) 15 to 50 weight percent of a low molecular weight substantially amorphous elastomer comprising homopolymers and copolymers of isobutylene having a glass transition temperature below −30° C., and (4) 1 to 2 weight percent crystalline polypropylene having a melt flow rate of 4-200 (ASTM D-1238).

4,022,729

HOT MELT PROTECTIVE WAX COATING

William A. Prickril, Lakewood, N.J., assignor to Cities Service Company, Tulsa, Okla.

Filed Mar. 27, 1975, Ser. No. 562,715

The portion of the term of this patent subsequent to Dec. 31, 1991, has been disclaimed.

Int. Cl.² C08L *91/06*

U.S. Cl. 260—28.5 B **10 Claims**

1. A composition comprising a hydrocarbon wax having about 10–40% by weight of oil, an ethylene/propylene/non-conjugated polyene terpolymer having a combined ethylene content of about 30–85% by weight and an iodine number of about 5–15, and said terpolymer constitutes from about 6% by weight to about 30% by weight of said composition, said composition additionally including an N-alkyl-γ-hydroxybutyramides release agent, said composition comprising from between about 0.1% to about 0.8% by weight of said agent.

4,022,730

OLIGOMERIC AQUEOUS FINISHES

Sheldon N. Lewis, Willow Grove; David R. Gehman, Harleysville, and Richard A. Haggard, Fort Washington, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 467,353, May 6, 1974. This application Oct. 21, 1974, Ser. No. 516,061

Int. Cl.² C09G *1/10*

U.S. Cl. 260—28.5 R **27 Claims**

1. A method for formulating an aqueous polish composition which contains a polymer emulsion and, as a leveling aid, a salt of a polymer comprising mer units of methacrylic acid and at least one ester of methacrylic acid, having an average carboxy content of at least about 2.6 and an average chain length, *n*, of from about 6 to about 20 mer units per molecule.

4,022,731

FREEZE-THAW STABLE, SELF-INVERTING, WATER-IN-OIL EMULSION

Joseph Michael Schmitt, Ridgefield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 24, 1975, Ser. No. 625,604

Int. Cl.² C08L *33/26*

U.S. Cl. 260—29.6 E **16 Claims**

1. A freeze-thaw stable, self-inverting, non-creaming water-in-oil emulsion containing a dispersion therein of finely-divided polymer particles, said emulsion comprising:

A. an aqueous phase ranging from about 70% to about 95%, by weight, based on the total weight of A and B, which is comprised of:

1. a water-soluble acrylamide polymer containing from about 0% to about 35%, by weight of the polymer, of a copolymerizable monomer of an acrylic acid or (methacrylamidopropyl)trimethylammonium chloride, the acrylic acid in said polymer, if any, being from about 50% to about 100% neutralized, and having a concentration from about 27% to about 68%, by weight, based on the total weight of A, and
2. water in an amount ranging from about 32% to about 73%, by weight, based on the total weight of A,

B. a liquid hydrocarbon oil in an amount ranging from about 5% to about 30%, by weight, based on the total weight of A and B,

C. a water-in-oil emulsifying agent disposed between said aqueous phase and said liquid hydrocarbon at a concentration of about 0.1% to about 15.0%, by weight, based on the total weight of A, B and C and

D. an inverting surfactant mixture comprising sodium bis(2-ethylhexyl) sulfosuccinate and a sodium bis(C_{11}–C_{15} alkyl) sulfosuccinate or an ethoxylated octyl or nonyl phenol, the amount of said sodium bis(2-ethylhexyl) sulfosuccinate ranging from about 0.25% to about 1.5%, by weight, when said polymer is cationic, and from about 2.8% to about 7.0%, by weight, when said polymer is anionic or non-ionic, the amount of said sodium bis(C_{11}–C_{15} alkyl) sulfosuccinate ranging from about 0.2% to about 0.6%, by weight, and the amount of said ethoxylated octyl or nonyl phenol ranging from about 1.5% to about 2.5%, by weight, said weight being based on the total weight of A, B, C and D.

4,022,732
POLY(AMIDE ACIDS) RELEASE AGENTS FOR PRESSURE-SENSITIVE ADHESIVE TAPES

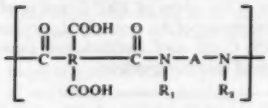
Andor Schwarcz, Niskayuna, N.Y., assignor to Nashua Corporation, Nashua, N.H.

Continuation of Ser. No. 482,341, June 24, 1974, abandoned, Division of Ser. No. 260,268, June 6, 1972, Pat. No. 3,861,956. This application Aug. 25, 1975, Ser. No. 607,442

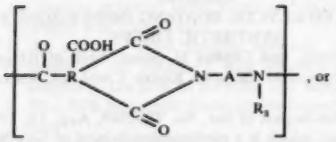
Int. Cl.² C08G *73/10*

U.S. Cl. 260—29.6 NR **14 Claims**

1. A polymeric composition suitable as a release agent for pressure-sensitive adhesives comprising the reaction product of a tetracarboxylic dianhydride and an N-fatty diamine having the general recurring formulae:



I.



II.

III. mixtures thereof wherein R is a tetravalent radical having at least 4 carbon atoms, and wherein in the dianhydride the four carbonyl groups are attached to separate carbon atoms and each pair of carbonyl groups is directly attached to adjacent nuclear carbon atoms, A is a divalent organic radical having from 2 to 15 carbon atoms, the amino groups in the diamine component being attached to separate carbon atoms, R_1 is an alkyl radical having a straight chain containing about 1 to 30 carbon atoms or hydrogen and R_2 is an alkyl radical having a straight chain containing about 12 to 30 carbon atoms, the polymer having an intrinsic viscosity of more than about 0.04 up to 0.07 as measured in tetrahydrofuran at 30° C.

4,022,733
GRAFT POLYMERIZATION PROCESS

Fred M. Peng, Longmeadow, and William O. Dalton, Hampden, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed June 25, 1975, Ser. No. 590,364

Int. Cl.² C08L *9/04, 9/08, 11/02*

U.S. Cl. 260—29.7 UP **12 Claims**

1. In the process for grafting styrene-type monomers selected from the group consisting of styrene, alpha-methylstyrene and ring substituted chlorostyrene and bromostyrene and nitrile-type monomers selected from the group consisting of acrylonitrile and methacrylonitrile onto a polychloroprene latex which has been stabilized with a substance which inhibits the graft polymerization reaction using a mercaptan chain transfer agent, the improvement which comprises carrying out the graft polymerization reaction in the presence of from 1 to 10 parts of latex seed particles per hundred parts of polychloroprene rubber having an average particle size smaller than that of the polychloroprene latex particles to be grafted.

4,022,734
POLYMER LATICES CONTAINING A WATER SOLUBLE SALT OF POLYBASIC FATTY ACID AND 2-ALKYL IMIDAZOLINE DERIVATIVE FOR USE IN FIBER DISPERSIONS

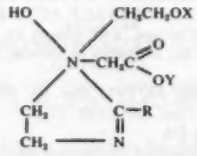
Vincent Martion Rasicci, Avon Lake; Raymond Nicholas Swanson, and Paul Arthur Clotz, both of Lorain, all of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed May 29, 1975, Ser. No. 581,821

Int. Cl.² C08L *33/08*

U.S. Cl. 260—29.6 MN **10 Claims**

1. In the process for preparing fiber sheets having polymer latex particles deposited on the fibers wherein said polymer contains polymerized vinylidene monomers containing at least one terminal $CH_2<$ grouping and the polymeric latices are added to fiber slurries or dispersions before formation of a sheet therefrom by coagulation, the improvement which comprises adding to said dispersion a storage stable polymer latex having a broad range of Canadian standard freeness responses comprising an aqueous dispersion of said polymer and stabilizing amounts of water-soluble salts of polybasic fatty acids containing 36 to 54 carbon atoms and a water-soluble 2-alkyl imidazoline derivative having the structure



wherein X is an alkali metal or a

Y is an alkali metal and R is an alkyl group derived from a fatty acid containing from about 6 to about 20 carbon atoms.

4,022,735

COLOR DEVELOPING COATING COMPOSITIONS CONTAINING REACTIVE PIGMENTS PARTICULARLY FOR MANIFOLD COPY PAPER

Thomas D. Thompson, Flemington, N.J., assignor to Yara Engineering Corporation, Elizabeth, N.J.

Filed Aug. 22, 1975, Ser. No. 606,975
Int. Cl.² C08L 9/10
U.S. Cl. 260—29.7 W 8 Claims

1. A color developing coating composition for manifold copy paper and the like comprising a mixture of a dispersing agent, an adhesive and a reactive pigment consisting essentially of a mixture of salt of a polyvalent cation, a ligand, kaolinite and a member selected from the group consisting of bentonite and montmorillonite.

4,022,736

FREEZE-THAW STABLE, SELF-INVERTING, WATER-IN-OIL EMULSION

Joseph Michael Schmitt, Ridgefield, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Oct. 22, 1975, Ser. No. 624,625
Int. Cl.² C08L 33/02
U.S. Cl. 260—29.6 E 9 Claims

1. A freeze-thaw stable, self-inverting, water-in-oil emulsion containing a dispersion therein of finely-divided copolymer particles, said emulsion comprising:

A. an aqueous phase ranging from about 75% to about 95%, by weight, based on the total weight of A and B, which is comprised of:

1. a water soluble acrylamide-acrylic acid copolymer containing from about 25% to about 35%, by weight, based on the total weight of the copolymer, of an acrylic acid, the acrylic acid in said copolymer being from about 50% to about 75% neutralized and having a concentration from about 27% to about 68%, by weight based on the total weight of A, and

2. water in an amount ranging from about 32% to about 73%, by weight, based on the total weight of A,

B. a liquid hydrocarbon oil in an amount ranging from about 5% to about 25%, by weight, based on the total weight of A and B,

C. a water-in-oil emulsifying agent disposed between said aqueous phase and said liquid hydrocarbon at a concentration of about 0.1% to about 15.0%, by weight, based on the total weight of A, B and C and

D. an inverting surfactant comprising the reaction product of about one mole of a fatty alcohol of about 12–18 carbon atoms with from about 6–10 moles of ethylene oxide in an amount ranging from more than about 2.0% to not over about 3.2%, by weight, based on the total weight of A, B, C and D.

4,022,737

AQUEOUS DISPERSIONS OF HYDROPHOBIC POLYMER PARTICLES USING SURFACE ACTIVE POLYMERS

Kazys Sekmakas, Chicago, and Robert O. Yates, Arlington Heights, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Aug. 20, 1971, Ser. No. 173,641
Int. Cl.² C08L 61/20
U.S. Cl. 260—29.4 UA 18 Claims

1. An aqueous dispersion comprising particles of a normally solid polyvinylidene fluoride hydrophobic addition polymer having a particle size of from about 0.1 to about 60 microns in average diameter and not stably dispersible in water in the absence of extraneous surface active agent, said particles being stably dispersed in an aqueous medium comprising water having dissolved therein, as the essential agent dispersing said particles, at least 0.05%, based on the weight of hydrophobic polymer particles, of a carboxy functional surface active copolymer having an acid value of at least about 20 and containing at least 30% by weight of copolymerized monoethylenic monomer providing terminal hydrocarbon side chains having at least 8 carbon atoms in the copolymer, said copolymer being dissolved in the aqueous medium by means of salt formation with a base.

4,022,738

DEVELOPING POWDER

Masato Shimada, Tokyo, and Katsuomi Kobayashi, Yokohama, both of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Nov. 28, 1975, Ser. No. 636,303
Claims priority, application Japan, Dec. 12, 1974, 49-142738
Int. Cl.² C08L 91/00
U.S. Cl. 260—28 P 6 Claims

1. In a flowable, pressure-fixable, dry powder useful as a toner for developing electrostatic latent images or magnetic latent images, said powder consisting essentially of coloring matter selected from the group consisting of pigments and dyestuffs blended with synthetic resin, the improvement which comprises: said synthetic resin consists essentially of a mixture of (A) from 5 to 95 parts by weight of a polyolefin having a molecular weight of from 1000 to 10000 and selected from the group consisting of polyethylene and polypropylene, and (B) from 5 to 95 parts by weight of alkyl (C_4 to C_{17})-modified phenol resin.

4,022,739

COMPOSITION FOR PLUGGING BLAST-FURNACE TAP-HOLE

Fred Bove, Warken, Luxembourg, assignor to Terrac Company Limited, Great Britain

Continuation-in-part of Ser. No. 468,173, May 8, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,089
Claims priority, application Luxembourg, June 6, 1973, 67749
Int. Cl.² C08L 95/00
U.S. Cl. 260—28.5 C 20 Claims

1. Blast-furnace tap-hole plugging mix composition consisting essentially of about 70% to 85% of a mineral component comprising refractory clay, a refractory aggregate having a high mechanical strength and a high-carbon mineral material, and of a polymerizable hydrocarbon binder selected from the group consisting of a hydrocarbon derivative derived from the distillation of crude petroleum oil and having an initial boiling point higher than 200° C, and a thermosetting resin which is stable at temperatures of the order of 200° C and is of such composition that the beginning of the mass setting process can be adjusted from 130° C up, said hydrocarbon derivative comprising at least 5% of said composition.

4,022,740

WATER AND GLYCOL BONDING DISPERSIONS FOR SYNTHETIC FIBERS

Gerald P. Morie, and Cephas H. Sloan, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 498,349, Aug. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 411,117, Oct. 30, 1973, abandoned. This application Apr. 30, 1975, Ser. No. 573,228
Int. Cl.² C08G 51/24
U.S. Cl. 260—29.2 E 8 Claims

1. A water and glycol bonding dispersion, the bonding dispersion being non-tacky and being effective for forming a bond between fibers with the bond being dispersible by water, the bonding dispersion comprising water present in the amount of about 0.1–20% by weight and at least one high boiling glycol present in the amount of about 40–94.9% by weight selected from 1,2-propanediol, 1,3-propanediol, 1,4-butanediol, 1,2-butanediol, and 1,3-butanediol; and water and glycol dispersible polymers present in the amount of about

5–40% by weight selected from polyesters of combinations of isophthalic acid, and the sodium, potassium, or lithium salt of sulfoisophthalic acid reacted with diethylene glycol or triethylene glycol; from terephthalic acid and the sodium, potassium or lithium salt of sulfoisophthalic acid reacted with diethylene glycol or triethyleneglycol.

4,022,741

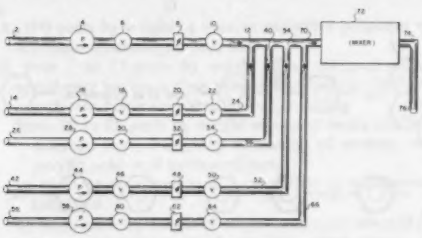
CONTINUOUS PROCESS FOR THE PREPARATION OF A CATIONICALLY MODIFIED ACRYLAMIDE POLYMER

Richard F. Tuka, Oak Lawn; Peter H. Vossos, Lisle; Ralph R. Nielsen, Oak Lawn, and Carl J. Guardia, Joliet, all of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 631,284, Nov. 12, 1975. This application Mar. 15, 1976, Ser. No. 666,982

Int. Cl.² C08K *3/00*; C08G *12/06*; C08F *20/56*

U.S. Cl. 260—29.4 UA 1 Claim



1. A process for the preparation of a dilute aqueous solution of a cationically modified polyacrylamide from a water-in-oil emulsion of a finely divided water soluble acrylamide polymer said process comprising:

A. Forming a continuous process stream containing:

i. 1.0 – 15.0% by weight of a water soluble lower alkyl secondary amine containing 2 – 4 carbon atoms;

ii. 0.5 – 4.0% by weight of formaldehyde, said formaldehyde being introduced as an aqueous solution containing from 1 – 40% by weight formaldehyde, the amount of formaldehyde added being further characterized as being in a substantially equal molar ratio to the amount of secondary amine added in i;

iii. 1.4 – 9% by weight of an acrylamide polymer, said acrylamide polymer being contained in a water-in-oil emulsion which comprises:

a. An aqueous phase ranging between 30 – 95% by weight of the emulsion, said aqueous phase being defined as the sum of polymer and water present;

b. 20 – 50% by weight finely divided acrylamide polymer;

c. 5 – 70% by weight of a hydrophobic liquid;

d. .1 – 21% by weight of a water-in-oil emulsifying agent;

iv. .1 – 2% by weight of a water soluble hydrophilic surfactant capable of inverting the water-in-oil emulsion of iii; and,

v. Water;

B. Subjecting said continuous process stream to turbulent in-line mixing whereby said water-in-oil emulsion of a finely divided acrylamide polymer is inverted, and the reaction of the secondary amine formaldehyde, and acrylamide polymer with each other is affected; and then,

C. Recovering continuously a 1.0 – 15% aqueous solution of a cationically modified acrylamide polymer.

4,022,742

COATING COMPOSITION

Tatsushiro Yoshimura, Takatsuki; Seisuke Suzue; Shigetake Tominaga, both of Ibaraki; Mutsusuke Namba, and Toshio Mizuno, both of Setttsu, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka, Japan

Filed May 27, 1975, Ser. No. 580,823

Claims priority, application Japan, May 27, 1974, 49-59973

Int. Cl.² C08L *57/08*

U.S. Cl. 260—29.6 F 8 Claims

1. A coating composition for formation of an undercoating film upon baking, which comprises a fluororesin having a particle size of 0.1 to 50 μ, a chelate compound prepared by reacting a water-soluble salt or alkoxide of a transition element of Group IV in the Periodic Table with a chelating agent and an inorganic, water-insoluble, fireproof material durable under the sintering temperature of the fluororesin in an aqueous medium containing a surfactant, said chelate compound forming an oxide of the transition element upon baking, the amount of the oxide of the transition element so formed being from 10 to 80% by weight based on the combined amount of said fluororesin and said transition element oxide.

4,022,743

AQUEOUS DISPERSIONS OF VINYL ACETATE/POLYACRYLATE ESTER OF PENTAERYTHRITOL/HYDROXYMETHYL DIACETONE ACRYLAMIDE COPOLYMERS HAVING IMPROVED ADHESION PROPERTIES

Ralph F. Patella, South Plainfield, and Joseph A. Vona, Westfield, both of N.J., assignors to Celanese Corporation, Louisville, Ky.

Continuation-in-part of Ser. No. 529,649, Dec. 4, 1974, abandoned. This application Nov. 28, 1975, Ser. No. 635,816

Int. Cl.² C08F *28/08*; C08L *31/04*; C09D *5/00*

U.S. Cl. 260—29.6 T 8 Claims

1. An aqueous copolymer dispersion coating composition comprising a copolymer of vinyl acetate dispersed in water in the presence of an anionic or nonionic surfactant or mixture thereof wherein the copolymer contains by weight based on the total weight of the copolymer

96.5 to 70 percent vinyl acetate;

3 to 10 percent tri or tetraacrylate or methacrylate ester of pentaerythritol;

0.5 to 3 percent hydroxymethyl diacetone acrylamide; and

0 to 26.5 percent other monomer selected from the group consisting of alkyl acrylate or methacrylate esters wherein the alkyl group contains from 1 to 18 carbon atoms and mono- or dialkyl esters of polymerizable unsaturated dibasic acids wherein the alkyl group contains from 1 to 10 carbon atoms.

4,022,744

CONTINUOUS POLYMERIZATION PROCESS IN EMULSION

Massimo D'Achille, and Mario Bucci, both of Domodossola (Novara), Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Filed Dec. 8, 1975, Ser. No. 638,744

Claims priority, application Italy, Dec. 10, 1974, 30363/74

Int. Cl.² C08L *31/04*

U.S. Cl. 260—29.6 R 3 Claims

1. In a process for the continuous polymerization, in aqueous emulsion, of monomers having one $CH_2 = C<$ group comprising reacting said monomers in the presence of water, initiators, surfactants and buffers in a series of reactors, each reactor carrying out a selected polymerization step, the improvement comprising having the reactors arranged in cascade and feeding the reaction mixture from the reactor at the lowest level to the reactor at the highest level.

4,022,745

PROCESS FOR THE PREPARATION OF A GLUE BASED ON A THERMOPLASTIC ELASTOMERIC BLOCK-COPOLYMER

Lowhardt A. A. Schoen, Geleen, and Franciscus A. Busschers, Spaubeek, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Jan. 21, 1975, Ser. No. 542,867

Claims priority, application Netherlands, Jan. 25, 1974, 7401014

Int. Cl.[2] C08K *5/06*

U.S. Cl. 260—30.2 12 Claims

1. An adhesive composition, based on a thermoplastic elastomeric block-copolymer, comprising

1. an inert organic vehicle which is an aromatic hydrocarbon, a chlorinated lower hydrocarbon containing 1 to 4 carbon atoms or tetrahydrofuran, having a boiling point below 150° C, said inert organic vehicle being a solvent which is unreactive with (2) and (3) and is a solvent for the components (2) and (3) below wherein

2. a thermoplastic elastomeric block-copolymer of the formula $AB(A)_n$

wherein A is a terminal non-elastomeric block, and is an aryl-substituted vinyl compound, wherein said aryl may be substituted or unsubstituted, and if substituted, the substituents may be lower alkyl of 1 to 4 carbon atoms, or halogen and wherein said vinyl group contains at least 2 carbon atoms, said vinyl group being substituted or unsubstituted in the alpha or beta position by substituents including lower alkyl of 1 to 4 carbon atoms or by halogen atoms;

B is an elastomeric polymer block, formed of a monomeric conjugated diene of 4 to 12 carbon atoms;

n is the number between 1 to 10; and

3. a polymer containing 2 to 5 free isocyanate groups per molecule and having a molecular chain with a molecular weight of 500 to 10,000, and being the reaction product of a diisocyanate and telechelic rubber homopolymers containing hydroxyl groups and based on a conjugated aliphatic diene, and telechelic rubbery copolymers containing hydroxyl groups and based on at least one conjugated aliphatic diene in combination with at least one copolymerizable olefinically unsaturated comonomer, in which reaction product, substantially all hydroxyl groups are replaced by a radical containing at least one free isocyanate group which is the reaction product of said hydroxyl groups with said di-isocyanate radicals, said inert vehicle being a solvent for components (2) and (3), wherein the combination of the block-copolymer (2) and (3) polymer containing isocyanate groups are present in the dissolved state in an amount of between 5 and 60% by weight of the composition.

4,022,746

BIS-ETHYNYL HETEROCYCLIC COMPOSITIONS AND METHOD OF SNYTHESIS

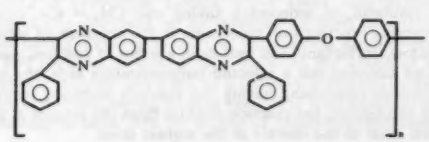
Robert F. Kovar, Dayton, and Fred E. Arnold, Centerville, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 612,078

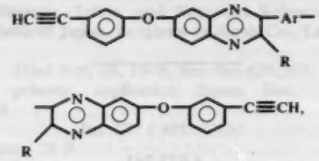
Int. Cl.[2] C08K *5/34*

U.S. Cl. 260—30.2 5 Claims

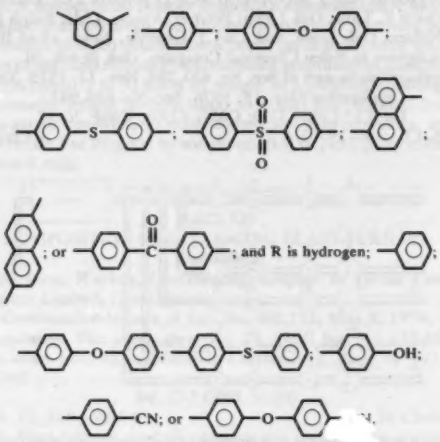
1. A composition consisting essentially of a polyphenyl quinoxaline thermoplastic having the following formula:



wherein n is an integer ranging from about 10 to 200 as determined by the light scattering technique, and about 5 to 30 weight percent, based upon the weight of the thermoplastic, of a bis-ethynyl quinoxaline compound having the following formula:



wherein Ar is



4,022,747

SILICONE RUBBER COMPOSITIONS

Kunio Itoh; Naoyoshi Kuga, and Takeshi Fukuda, all of Annaka, Japan, assignors to Shin-Etsu Chemical Company Limited, Tokyo, Japan

Filed Oct. 28, 1975, Ser. No. 626,350

Claims priority, application Japan, Oct. 28, 1974, 49-124095

Int. Cl.[2] C08L *83/04*

U.S. Cl. 260—37 SB 14 Claims

1. A silicone rubber composition consisting essentially of (a) 100 parts by weight of a diorganopolysiloxane having a viscosity of at least 1,000,000 centistokes at 25° C, represented by the average formula

$$R_aSiO_{\frac{4-a}{2}}$$

where R is an organic group, from 20 to 90 mole % of the groups represented by R being methyl groups, from 8 to 80 mole % of same being substituted or unsubstituted monovalent hydrocarbon groups having from 2 to 4 carbon atoms, and from 0 to 7 mole % of same being substituted or unsubstituted aromatic monovalent hydrocarbon groups having from 6 to 9 carbon atoms, and a is a number from 1.98 inclusive to 2.02 inclusive, (*b*) from 1 to 20 parts by weight of a trimethylsilyl-terminated linear organopolysiloxane having a viscosity of at most 200 centistokes at 25° C, represented by the average formula

$$R'_bSiO_{\frac{4-b}{2}}$$

where R' is a substituted or unsubstituted monovalent hydrocarbon group and b is a number of 1.98 inclusive to 3 inclusive, (*c*) from 20 to 100 parts by weight of a silica filler, and (*d*) from 0.5 to 5 parts by weight of an organic peroxide.

4,022,748
THERMOPLASTIC POLYESTER MOLDING COMPOSITIONS

Karl Schlichting, Bobenheim-Roxheim; Peter Horn, Ludwigshafen; Rolf Wurmb, Heidelberg; Claus Cordes, Weisenheim, and Hans-Josef Sterzel, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Sept. 5, 1975, Ser. No. 610,651

Claims priority, application Germany, Sept. 18, 1974, 2444584

Int. Cl.² C08G *39/10*

U.S. Cl. 260—40 R **6 Claims**

1. Thermoplastic polyester molding compositions comprising:

A. 100 parts by weight of a linear saturated polyester of an aromatic dicarboxylic acid and

B. from 1 to 25 parts by weight of a rubber-elastic graft copolymer having a glass temperature below −20° C said copolymer being prepared by polymerizing

from 10 to 85 parts by weight of one or more monomers selected from the group consisting of styrene, methacrylic acid, and methacrylates,

up to 35 parts by weight of acrylonitrile or methacrylonitrile, and

up to 20 parts by weight of other monomers selected from the group consisting of acrylates, vinyl esters, vinyl ethers, vinyl halides, and vinyl-substituted heterocyclic compounds in the presence of 100 parts by weight of a prepolymer of

a. from 10 to 99% by weight of an acrylate of C_{1-18} alcohol, and

b. from 1 to 90% by weight of a monomer bearing 2 olefinic double bonds, and

c. up to 25% by weight of other monomers selected from the group consisting of vinyl ethers, vinyl esters, vinyl halides and vinyl-substituted heterocyclic compounds.

4,022,749
FORMATION OF COMPOSITE PARTICULATE MATERIAL USING HIGH ENERGY ROTARY IMPACT MILLING

William L. Kuechler, North Haven, Conn., assignor to Entoleter, Inc., New Haven, Conn.

Continuation of Ser. No. 667,414, Sept. 13, 1967, abandoned, which is a continuation-in-part of Ser. No. 368,154, May 18, 1964, abandoned. This application Mar. 7, 1975, Ser. No. 556,401

Int. Cl.² C08J *3/20*; C08K *3/34, 3/40*

U.S. Cl. 260—42.18 **13 Claims**

1. A method of forming a composite particulate material having a plastic, particulate, integratable ingredient capable of being formed into a continuous phase, coherent body and a particulate additive ingredient of submicro particle size, comprising impact milling of said two ingredients in a rotary mill at a linear speed for the impactors of the mill of at least about 300 feet per second to cause the additive particles to deagglomerate and adhere to the plastic particles as substantially nonagglomerated individual particles until at least about twenty percent of weight of the composite is said additive.

4,022,750
PROCESS FOR THE PRODUCTION OF A HALOGEN-CONTAINING ARCYLIC SYNTHETIC FIBER IMPROVED IN FLAME RETARDANCY

Kenji Takeya; Hiroshi Suzuki, and Tadashi Ichimaru, all of Okayama, Japan, assignors to American Cyanamid Company, Stamford, Conn.

Filed July 11, 1974, Ser. No. 487,529

Int. Cl.² C08K *3/22, 5/02*

U.S. Cl. 260—45.75 H **8 Claims**

1. A process for preparing a halogen-containing acrylic fiber of improved flame retardancy which comprises: preparing a spinning composition of a halogen-containing acrylonitrile polymer composed of at least 50 weight percent of acrylonitrile, said halogen being selected from chlorine and bromine and being in the amount of about 3 to 40 weight percent based on the weight of said polymer; uniformly dispersing in said spinning composition from about 0.1 to 10 weight percent, based on the weight of said polymer, of a diorganotin oxide compound of the formula

wherein R_1 and R_2 are individually selected from alkyl, alkenyl, aryl, alkaryl, aralkyl, cycloalkyl, and cycloalkenyl groups containing up to about 22 carbon atoms; and spinning the resulting dispersion.

4,022,751
STABILIZATION OF HIGH TEMPERATURE PLASTICS CONTAINING ARYL-METHYLENE ARYLENE GROUPS AGAINST THERMAL OXIDATIVE DEGRADATION

Burnett H. Johnson, Baytown, Tex., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Mar. 13, 1975, Ser. No. 558,178

Int. Cl.² C08K *5/09, 3/16, 3/10*

U.S. Cl. 260—45.75 C **17 Claims**

1. A stabilized high performance, high temperature resistant solid polymeric composition comprising:

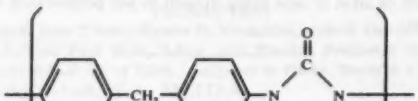
a. a major portion of a high performance polymer having aryl methylene groups;

b. a minor amount, sufficient to substantially increase the high temperature oxidative stability of said polymer, of a compound selected from the group consisting of

cupric acetate, cuprous chloride, cuprous bromide, cobaltus chloride, cupric chloride, cupric bromide, nickelous chloride, cuprous iodide and mixtures thereof.

7. A stabilized high performance, high temperature resistant polymeric composition comprising:

a. a major portion of a high performance polymer having at least one repeating unit which is represented as



and

b. an effective amount, sufficient to substantially increase the high temperature oxidative stability of said polymer, of a compound selected from the group consisting of

i. copper, nickel and cobalt salts of inorganic acids and C_1 to C_{20} organic acids;

ii. copper, nickel and cobalt chelates;

iii. combinations of the foregoing.

4,022,752

TOUGH POLYBUTYLENE TEREPHTHALATE MOLDING COMPOSITIONS SHOWING GOOD THERMO-AGING STABILITY AND PROCESSING STABILITY

Peter Horn, Ludwigshafen; Rolf Wurmb, Heidelberg; Dietrich Wolff, Schwetzingen, and Wolfgang Seydl, Frankenthal, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 14, 1975, Ser. No. 568,145

Claims priority, application Germany, Apr. 25, 1974, 2419968

Int. Cl.² C08K *5/16*

U.S. Cl. 260—45.75 B **5 Claims**

1. Tough polybutylene terephthalate molding compositions showing good thermo-aging and processing stabilities and having a relative viscosity of from 1.3 to 2.0, as measured in a mixture of phenol/o-dichlorobenzene at 25° C, said compositions comprising: polybutylene terephthalate and from 0.01 to 10% by weight, based on the polybutylene terephthalate, of adducts of isocyanates with OH—, NH—, CH—, or SH— acidic compounds.

4,022,753

REACTION PRODUCTS OF POLYSILOXANES AND POLYPHENOLS

Friedrich Lohse, Oberwil, and Bruno Schreiber, Aesch, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 6, 1975, Ser. No. 556,069

Claims priority, application Switzerland, Mar. 25, 1974, 4108/74

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 R **1 Claim**

1. A reaction product of a polysiloxane and a novolac, said product having phenolic hydroxyl groups and being obtained by reacting a polysiloxane compound of the formula I

(I)

wherein R_1 and R_2 are independently members selected from the group consisting of methyl, ethyl, propyl, and phenyl or wherein R_1 and R_2 are independently different members along the polysiloxane chain, said members being selected from the group consisting of methyl, ethyl, propyl and phenyl, R_4 is alkyl or acyl and x is a number of from 2 to 30, with a novoloc having an average of four hydroxyl groups, said novolac being obtained from formaldehyde and cresol, at elevated temperatures, using 1.2 to 10 equivalents of phenolic hydroxyl per 1 equivalent of alkyl or acyl, said equivalents of phenolic hydroxyl being present in the novolac reactant and said equivalents of alkyl or acyl being present in the polysiloxane reactant.

4,022,754

NOVEL COPOLYMER HAVING UTILITY AS CONTACT LENS

John Gordon Bernard Howes, Hertford Heath; Rupert Aleck Selway; Nicholas Mario da Costa, both of Harlow, and William Duncan Potter, Puckeridge, all of England, assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jan. 27, 1975, Ser. No. 544,065

Claims priority, application United Kingdom, Mar. 29, 1974, 14082/74; July 4, 1974, 29758/74; Nov. 22, 1974, 50813/74

Int. Cl.² C08F *226/10*

U.S. Cl. 260—47 UA **23 Claims**

1. A lightly cross-linked hydrogel terpolymer formed from:

1. from 10 to 75%, by weight, of 3-methoxy-2-hydroxy propyl methacrylate;
2. N-vinyl-2-pyrrolidone;
3. a further copolymerizable monomer selected from the group consisting of methacrylamide and methacrylate monomers which are more hydrophobic than components (1) and (2) and which will increase the strength and stiffness of the swollen cross-linked N-vinyl-2-pyrrolidone, the weight ratio of N-vinyl-2-pyrrolidone to the said further copolymerizable monomer ranging from 50:50 to 70:30;

the terpolymer being cross-linked with up to 2%, by weight, of copolymerizable crosslinking agent selected from the group consisting of methacrylyl and acrylyl crosslinking agents whereby it is in the form of a lightly cross-linked hydrogel, of water uptake up to 65% based on the total eventual weight of gel, suitable for use as a contact lens.

4,022,755

CYANATO-GROUP-CONTAINING PHENOL RESIN

Mineaki Tanigaichi, Tokyo; Susumu Motoori, Kashiwa, and Kazuo Noguchi, Matsudo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

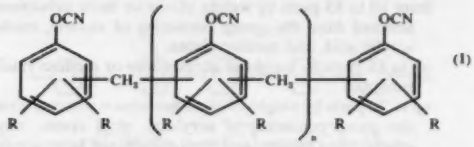
Filed July 21, 1975, Ser. No. 597,715

Claims priority, application Japan, July 29, 1974, 49-86723

Int. Cl.² C08L *61/06*

U.S. Cl. 260—59 R **3 Claims**

1. A cyanato-group-containing phenol resin comprising a mixture of polymers represented by the formula:



(I)

wherein *n* is 0 or an integer of 1 or more; and R's may be the same or different, and each R is a hydrogen atom or a methyl group, and containing 50% by weight or more in total of polymers having formula in which *n* is an integer of 1 to 3, the number average molecular weight of said phenol resin being 350 to 700, as determined by gel permeation chromatography using tetrahydrofuran as solvent.

4,022,756

DIMENSIONALLY STABLE 6TA/6IA FIBERS

Richard D. Chapman; Donald A. Holmer; Oscar A. Pickett, Jr., and James H. Saunders, all of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

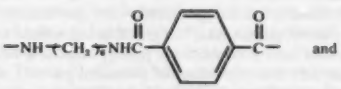
Continuation-in-part of Ser. No. 392,593, Aug. 29, 1973, abandoned, which is a division of Ser. No. 216,206, Jan. 7, 1972, abandoned. This application Apr. 9, 1975, Ser. No. 566,551

Int. Cl.² C08G *69/26*

U.S. Cl. 260—78 R **3 Claims**

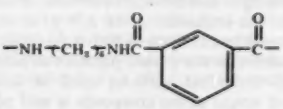
1. A molecularly oriented and annealed dimensionally stable fiber of a copolyamide consisting essentially of recurring units of the formulas

(I)



and

(II)



wherein the mole ratio of units (I) to units (II) is between 50:50 and 80:20, said fiber being characterized in having a boiling water shrinkage value of 1.65% up to less than 10%.

4,022,757

DICARBAMIC ACID DIESTERS CONTAINING PHOSPHORUS

Hans-Dieter Block; Udo-Winfried Hendricks, both of Cologne, and Klaus Walz, Bergisch-Neukirchen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

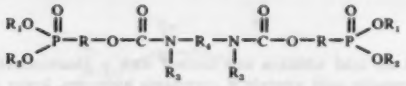
Filed Jan. 17, 1975, Ser. No. 542,049

Claims priority, application Germany, Jan. 17, 1974, 2402174

Int. Cl.² C07F 9/28

U.S. Cl. 260—932 **3 Claims**

1. Dicarbamic diesters of the formula



wherein

R is straight-chain or branched C_1–C_4 alkylene unsubstituted or substituted with at least one halogen atom;

R_1 and R_2 independently of one another are C_1–C_4 alkyl unsubstituted or substituted with halogen or together with the oxygen atoms and phosphorus atom form a 5- to 7-membered heterocyclic structure;

R_3 is hydrogen, hydroxymethyl, or C_1–C_4 alkoxymethyl;

R_4 is phenylene; cyclohexylene; toluylene; xylylene; diphenylenemethane which is unsubstituted or substituted with C_1–C_4 alkyl, halogen, or C_1–C_4 -alkoxycarbonyl; of which the two bonds must start from different carbon atoms and wherein the phosphorus content of the diester is more than 5% by weight.

4,022,758

ISOLATION OF COAGULATION FACTORS I AND VIII FROM BIOLOGICAL MATERIAL

Lars-Olov Andersson, Knivsta; Håkan Gunnar Borg, Huddinge; Nanna Forsman; Gunnar Hanshoff, both of Jarfalla; Göran Lindroos, Stockholm; Maggie Miller-Andersson, Jarfalla, and Elisabeth Charlotte Carling nee Ehrenberg, Dalby, all of Sweden, assignors to AB Kabi, Stockholm, Sweden

Division of Ser. No. 371,491, June 19, 1973, Pat. No. 3,920,625. This application July 30, 1975, Ser. No. 598,322

Int. Cl.² H23J 1/06

U.S. Cl. 260—112 B **15 Claims**

1. In a method of isolating at least one of the blood coagulation factors fibrinogen and the antihemophilia factor VIII, from an animal blood tissue product containing fibrinogen or both of these factors, the improvement which comprises (i) contacting a water-insoluble gel matrix adsorbing agent selected from cross-linked dextran sulfate-dextran, cross-linked dextran sulfate-agarose, cross-linked dextran sulfate epichlorhydrin-agarose, dextran sulfate epichlorhydrin-cross-linked agarose, cross-linked chondroitin sulfate, cross-linked heparin-agarose, cross-linked heparin, cross-linked benzidine-2,2′-disulfonic acid-agarose, and cross-linked benzidine-2,2′-disulfonic acid-dextran, with said animal blood tissue product dissolved in an aqueous medium otherwise inert to the therein dissolved content of the said blood tissue product, and (ii) separating the non-adsorbed solution from the gel matrix.

4,022,759

TRIPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, and Alfred Campbell, both of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Jan. 19, 1976, Ser. No. 650,095

Int. Cl.² C07C 103/52

U.S. Cl. 260—112.5 LH **4 Claims**

1. A tripeptide represented by the fformula

A-R_1-Tyr(benzyl)-Ser(benzyl)-R_2

wherein A is t-butoxycarbonyl or cyclohexylcarbonyl, R_1 is Trp, His(benzyl), Cys(benzyl) or Pro and R_2 is lower alkoxy, hydrazino, amino, lower alkylamino, di(lower alkyl)amino, benzylamino, allylamino, (diethoxyphosphinylmethyl)amino, 2-(diethoxyphsophinyl)ethylamino or 2-[[(phenylmethyl-)amino]sulfonyl]ethylamino.

4,022,760

TRIPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney, Ann Arbor, Mich., assignor to Parke, Davis & Company, Detroit, Mich.

Filed Jan. 19, 1976, Ser. No. 650,096

Int. Cl.² C07C 103/52

U.S. Cl. 260—112.5 LH **2 Claims**

1. A tripeptide represented by the formula

A-R_1-Tyr(benzyl)-Thr(benzyl)-R_2

wherein *A* is t-butoxycarbonyl or cyclohexylcarbonyl, R_1 is Trp, His(benzyl), Cys(benzyl) or Pro and R_2 is lower alkoxy, hydrazino, amino, lower alkylamino, di(lower alkyl)amino, benzylamino, allylamino, (diethoxyphosphinyl)methylamino, 2-(diethoxyphosphinyl)ethylamino or 2-[[(phenylmethyl-)amino]sulfonyl]ethylamino.

4,022,761

TRIPEPTIDES AND METHODS FOR THEIR PRODUCTION

Francis John Tinney; Ernest D. Nicolaides, both of Ann Arbor; Marland Paul Hutt, Saline, and Thomas Frederick Mich, Ann Arbor, all of Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed Jan. 19, 1976, Ser. No. 650,097

Int. Cl.² C07C 103/52

U.S. Cl. 260—112.5 LH **5 Claims**

1. A tripeptide represented by the formula

A-R_1-Ser(benzyl)-Tyr(benzyl)-R_2

wherein A is t-butoxycarbonyl or cyclohexylcarbonyl, R_1 is Trp, His(benzyl), Cys(benzyl) or Pro and R_2 is lower alkoxy, hydrazino, amino, lower alkylamino, di(lower alkyl)amino, benzylamino, allylamino, (diethoxyphosphinyl)-methylamino, 2-(diethoxyphosphinyl)ethylamino or 2-[[(phenylmethyl-)amino]sulfonyl]ethylamino.

4,022,762

WATER-SOLUBLE ACID AZO DYESTUFF CONTAINING A N-(p-SULPHOPHENOXYALKYL)-N-ALKYL AMINO GROUP

David Razavi, Paris, France, assignor to Produits Chimiques Ugine Kuhlmann, Paris, France

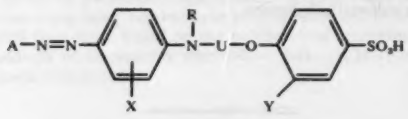
Continuation of Ser. No. 339,798, March 9, 1973, abandoned, which is a continuation-in-part of Ser. No. 18,340, March 10, 1970, abandoned. This application Mar. 24, 1975, Ser. No. 561,388

Claims priority, application France, Mar. 14, 1969, 6907258

Int. Cl.² C09B 29/08, 31/04; D06P 1/08, 3/24

U.S. Cl. 260—158 4 Claims

1. Water-soluble acid azo dyestuff of the formula:



(I)

wherein A is 2-thiazolyl, 4-nitro-2-thiazolyl, 2-benzothiazolyl, 6-methoxy-2-benzothiazolyl, 6-ethoxy-2-benzothiazolyl, 6-chloro-2-benzothiazolyl, 5,6-dichloro-2-benzothiazolyl, 4-bromo-6-chloro-2-benzothiazolyl, 4,6-dibromo-2-benzothiazolyl, 4-bromo-6-methoxy-2-benzothiazolyl, 4-bromo-6-ethoxy-2-benzothiazolyl, 4-bromo-5,6-dichloro-2-benzothiazolyl, 6-methylsulfonyl-2-benzothiazolyl, 4-bromo-6-methylsulfonyl-2-benzothiazolyl, or 6-hydroxyethylsulfonyl-2-benzothiazolyl, X is hydrogen, chlorine, methyl or trifluoromethyl, R is alkyl containing 1 to 4 carbon atoms, U is alkylene containing 1 to 5 carbon atoms, and Y is hydrogen, chlorine or methyl.

4,022,763

SULFAPHENYL-AZO-PHENYL-AZO-AMINOPHENYL DYESTUFFS

Richard Sommer, Leverkusen; Gerhard Wolfrum, Opladen, and Edgar Siegel, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

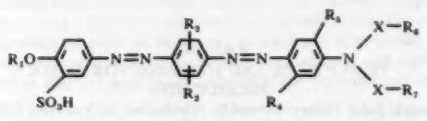
Filed Feb. 11, 1971, Ser. No. 114,686

Claims priority, application Germany, Feb. 14, 1970, 2006733; Oct. 10, 1970, 2049810

Int. Cl.² C09B 31/04, 31/08, 31/14; D06P 3/24

U.S. Cl. 260—186 5 Claims

1. Disazo dyestuff which in the form of the free acid corresponds to the formula



in which

R_1 stands for hydrogen, alkyl of 1–4 carbon atoms, or phenyl;

R_2, R_3 and R_4, independently of one another, stand for hydrogen, chloro, bromo, alkyl of 1–4 carbon atoms, alkoxy of 1–4 carbon atoms, alkylcarbonylamino of 1–4 carbon atoms, methylsulfonylamino, phenylcarbonylamino, chlorophenyl carbonylamino, or phenylsulfonylamino;

R_5 stands for hydrogen, alkyl of 1–4 carbon atoms or alkoxy of 1–4 carbon atoms;

R_6 and R_7 independently of one another, stand for hydrogen, hydroxy, cyano, chloro, bromo, alkylcarbonyloxy of 1–4 carbon atoms in the alkyl portion, alkoxycarbonyloxy of 1–4 carbon atoms in the alkoxy portion alkoxy carbonyl of 1–4 carbon atoms in the alkoxy portion, or phenyl; and

X stands for alkylene of 1–4 carbon atoms.

4,022,764

3-(META-OXYPHENYL) HEXAHYDROAZEPINES

Alan Chapman White, Windsor, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

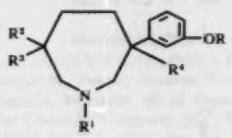
Filed Jan. 27, 1975, Ser. No. 544,477

Claims priority, application United Kingdom, Feb. 4, 1974, 04949/74

Int. Cl.² C07D 223/04

U.S. Cl. 260—239 B 5 Claims

1. A compound selected from the group consisting of a hexahydroazepine of formula



(II)

and an acid addition salt thereof with a pharmaceutically acceptable acid wherein R represents hydrogen, lower alkyl, benzyl or lower alkanoyl, R^1 represents hydrogen, lower alkyl, lower alkenyl, lower alkynyl, benzyl or cyclopropylmethyl, R^2 represents hydrogen, lower alkyl, lower alkenyl or lower alkynyl, R^3 represents lower alkyl, lower alkenyl or lower alkynyl and R^4 represents lower alkyl.

4,022,765

TRIAZOLO[4,3-d][1,4]BENZODIAZEPINE-6-ONES

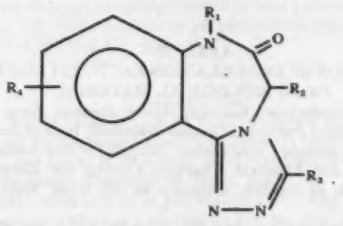
Peter C. Wade, Pennington, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 6, 1975, Ser. No. 538,975

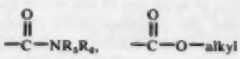
Int. Cl.³ C07D 471/14, 401/14, 413/06

U.S. Cl. 260—239.3 T 24 Claims

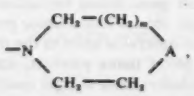
1. A compound having the structure



wherein R_1 is phenyl; R_2 is hydrogen or alkyl; R_3 is hydrogen, alkyl, haloalkyl, cyanoalkyl, trifluoromethyl, phenyl, benzyl,



or $-(CH_2)_n-NR_5R_6$; R_4 is hydrogen, halogen, nitro, cyano, trifluoromethyl, alkyl, alkoxy or alkylthio; R_5 and R_6 are the same or different and are hydrogen or alkyl, or R_5 and R_6 together with the nitrogen atom to which they are attached form a heterocyclic ring having the formula



wherein *m* is 0 or 1, A is CH—Q, N—Q or oxygen and Q is hydrogen or alkyl, provided that when *m* is 0, A is CH—Q; and *n* is 1, 2, 3 or 4: wherein alkyl and alkoxy in all instances refer to groups having 1 to 4 carbon atoms; and, when the compound contains a basic amino group, a pharmaceutically acceptable salt thereof.

4,022,766

PHARMACOLOGICALLY ACTIVE PYRROLODIAZEPINES

Luigi Fontanella; Luigi Mariani, both of Milan, and Giorgio Tarzia, Rome, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

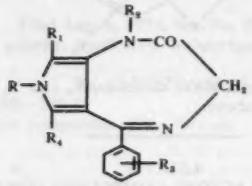
Filed Mar. 17, 1975, Ser. No. 559,093

Claims priority, application United Kingdom, Mar. 20, 1975, 12388/75

Int. Cl.² C07D *487/04*

U.S. Cl. 260—239.3 B **6 Claims**

1. A compound of the formula



[I]

wherein the symbol R represents one of hydrogen, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl and tert-butyl; R_1 represents one of hydrogen, methyl, ethyl and phenyl; R_2 represents one of hydrogen, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, sec-butyl and tert-butyl; R_3 represents one of hydrogen, methoxy, trifluoromethyl, chloro, bromo and fluoro; and R_4 represents methyl.

4,022,767

2-AMINOBENZODIAZEPINE-5-ONES

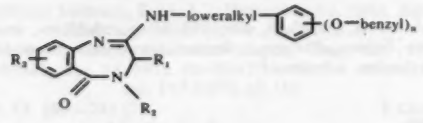
Richard J. Mohrbacher, Maple Glen, and Philip P. Grous, Philadelphia, both of Pa., assignors to McNeil Laboratories, Incorporated, Fort Washington, Pa.

Division of Ser. No. 615,667, Sept. 22, 1975. This application June 23, 1976, Ser. No. 699,092

Int. Cl.² C07D *243/14*

U.S. Cl. 260—239.3 D **1 Claim**

1. A compound having the formula:



wherein:

n is an integer from 1 to 3;

R_1 is a member selected from the group consisting of hydrogen and aryl, said aryl being a member selected from the group consisting of phenyl, trifluoromethylphenyl and phenyl substituted with from 1 to 3 members selected from the group consisting of halo, loweralkyl, hydroxy and loweralkoxy;

R_2 is loweralkyl; and

R_3 is a member selected from the group consisting of hydrogen, halo, nitro, loweralkoxy, and loweralkyl.

4,022,768

PROCESS FOR PREPARATION OF 1α,25-DIHYDROXYCHOLECALCIFEROL

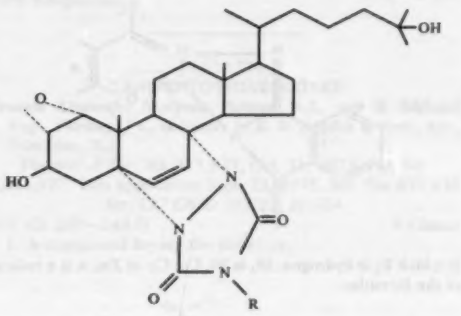
Isao Matsunaga, Tokyo; Kiyoshige Ochi, Kawagoe; Hiroyuki Nagano, Ageo; Minoru Shindo, Higashikurume; Masayuki Ishikawa; Chikara Kaneko, both of Tokyo, all of Japan, and Hector F. DeLuca, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Feb. 12, 1976, Ser. No. 657,375

Int. Cl.² C07J *71/00*

U.S. Cl. 260—239.5 **5 Claims**

3. A compound having the formula



where R represents an alkyl, aryl or mono-substituted aryl group.

4,022,769

ANDROST-4-EN-19-ONES

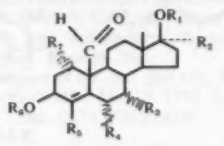
Joyce F. Grunwell, Hamilton, and Vladimir Petrow, Cincinnati, both of Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed May 13, 1974, Ser. No. 469,480

Int. Cl.² C07J *1/00*

U.S. Cl. 260—239.55 R **2 Claims**

1. An androst-4-en-19-one having the formula:



wherein

R_1 is selected from the group consisting of hydrogen, carboxylic acyl having from 1 to 12 carbon atoms, lower alkyl having from 1 to 3 carbon atoms, trialkylsilyl in which the alkyl group has from 1 to 5 carbon atoms, triphenylsilyl, 2-tetrahydropyranyl, 4-tetrahydropyranyl, 1-cycloalkenyl having from 5 to 7 carbon atoms, 1-methoxycycloalkyl and 1-ethoxycycloalkyl in which the cycloalkyl group has from 5 to 7 carbon atoms;

R_2 is selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, lower alkenyl having from 2 to 6 carbon atoms, lower alkynyl having from 2 to 6 carbon atoms, and when R_2 and OR_1 are taken together is oxo;

R_3, R_4, R_5 and R_7 are hydrogen and methyl; and

R_6 is lower alkyl having from 1 to 3 carbon atoms, trialkylsilyl in which the alkyl group has from 1 to 5 carbon atoms, triphenylsilyl, 2-tetrahydropyranyl, 4-tetrahydropyranyl, 1-cycloalkenyl having from 5 to 7 carbon atoms, 1-methoxycycloalkyl and 1-ethoxycycloalkyl in which the cycloalky group has from 5 to 7 carbon atoms.

4,022,770

METAL COMPLEXES OF AZOMETHINES AND PROCESS FOR THEIR MANUFACTURE

Francois L'Eplattenier, Therwil; Andre Pugin, and Jost von der Crone, both of Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

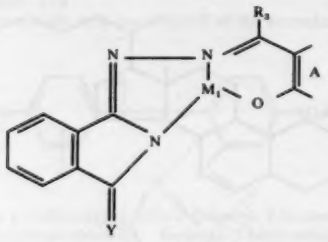
Filed Jan. 30, 1975, Ser. No. 545,457

Claims priority, application Switzerland, Feb. 6, 1974, 1625/74

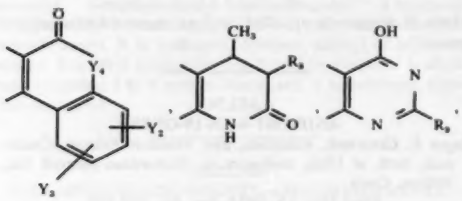
Int. Cl.² C07D *209/40*, *403/12*, *401/12*

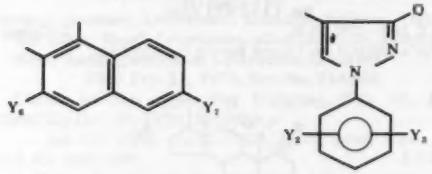
U.S. Cl. 260—240 G 5 Claims

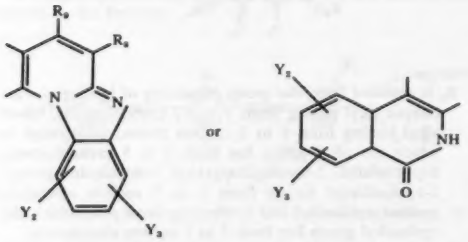
1. An azomethine metal complex of the formula



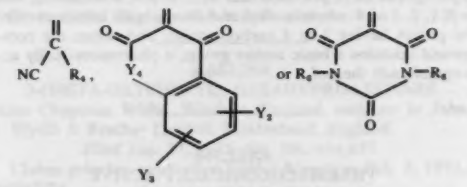
in which R_3 is hydrogen, M_1 is Ni, Cu, Co or Zn, A is a radical of the formulae



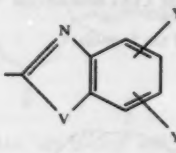




in which Q is methyl, alkoxycarbonyl with 2 to 5 carbon atoms or carbamoyl, R_8 is cyano, or carbamoyl, R_9 is hydrogen, or hydroxy, Y_2 and Y_3 is hydrogen, halogen, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, or nitro, Y_4 is oxygen, sulfur or amino, Y_6 is hydrogen, carboxy, carbamoyl, alkoxycarbamoyl containing 2 to 6 carbon atoms, alkylcarbamoyl containing 2 to 6 carbon atoms, phenylcarbamoyl, phenylcarbamoyl substituted in the phenyl moiety by halogen, alkyl of 1 to 4 carbon atoms, or alkoxy of 1 to 4 carbon atoms, Y_7 is hydrogen, halogen, methoxy, nitro or cyano, Y is a group of the formulae



in which Y_2, Y_3 and Y_4 have the above-indicated meanings, R_6 is hydrogen, alkyl of 1 to 4 carbon atoms, phenyl, phenyl substituted by halogen, alkyl of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms, R_4 is cyano, acyl, alkoxycarbonyl, carbamoyl, sulphamoyl, or a radical of the formula



in which V is oxygen, sulfur or imino, Y_2 and Y_3 have the meaning indicated above.

4,022,771

AMINOPHENYL LACTONE COMPOUNDS CONTAINING AN ETHYLENO GROUP

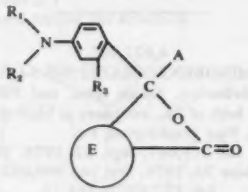
Sheldon Farber, Appleton, Wis., assignor to NCR Corporation, Dayton, Ohio

Filed Apr. 10, 1975, Ser. No. 566,852

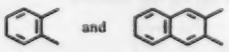
Int. Cl.² C07D *307/86*, *307/88*

U.S. Cl. 260—240 D 12 Claims

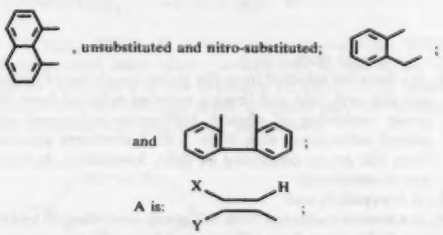
1. A compound represented by the formula:



wherein E is:



unsubstituted and alkyl-, cloro-, dichloro-, trichloro-, tetrachloro-, bromo-, dibromo-, tribromo-, tetrabromo-, nitro-, and dialkylamino- substituted;



, unsubstituted and nitro-substituted;

;

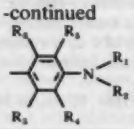
and

;

A is:

;

-continued

X is:  ;

4-alkoxyphenyl; 2,4-dialkoxyphenyl and 3,4-dialkoxyphenyl;

Y is: any X; hydrogen; carbalkoxy; and nitro;

R_1 and R_2 are: hydrogen, alkyl, unsubstituted phenyl, substituted phenyl, benzyl, acyl, and cycloalkyl; but R_1 and R_2 are not both phenyl;

R_3, R_4, R_5, and R_6 are: hydrogen, alkyl, phenyl, benzyl, alkoxy, halo, dialkylamino, monoalkylamino, amino and acylamino.

4,022,772
STYRENE COMPOUNDS

Geza Kormany, Allschwil; Guglielmo Kabas, Aesch; Hans Schlapfer, and Adolf Emil Siegrist, both of Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

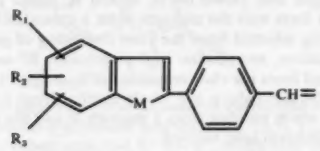
Filed Aug. 6, 1975, Ser. No. 601,883

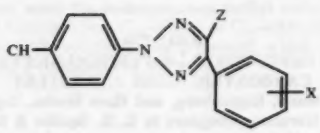
Claims priority, application Switzerland, Aug. 14, 1974, 11109/74

Int. Cl.² C07D *405/10*

U.S. Cl. 260—240 C **5 Claims**

1. Styrene compounds of the formula





wherein R_1 denotes hydrogen, chlorine, alkyl with 1 to 4 carbon atoms, phenylalkyl with 7 to 9 carbon atoms, phenyl, cyclohexyl or alkoxy with 1 to 4 carbon atoms, R_2 and R_3 independently of one another denote hydrogen or methyl, M denotes oxygen or sulphur, Z denotes hydrogen, methyl or phenyl and X denotes hydrogen or chlorine.

4,022,773
CEPHALOSPORIN ESTERS

Toshiyasu Ishimaru, D-14, 2-7, Momoyamadai, Suita, Japan

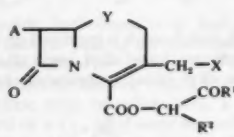
Filed Aug. 25, 1975, Ser. No. 607,363

Claims priority, application Japan, Aug. 29, 1974, 49-99581; Apr. 14, 1975, 50-45447

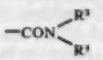
Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **9 Claims**

1. A compound having the formula:



, wherein A is phenylacetamido, phenoxyacetamido, formylamino, phthalimido, 2,2-dimethyl-3-nitroso-;b **4-phenyl-5-oxo-imidazolin-1-yl** or **2-methyl-3-nitroso-4-phenyl-5-oxo-imidazolin-1-yl**; Y is =S or =S—O; X is hydrogen or lower alkanoyloxy; R^1 is lower alkoxy, lower alkyl or phenyl and R^2 is lower alkoxycarbonyl, lower alkylcarbonyl or phenyl carbonyl, or a group of the formula;



in which R^3 and R^4, which may be the same or different, are hydrogen or lower alkyl or may, together with the nitrogen atom to which they are bonded and an oxygen atom, together form morpholino.

4,022,774
1,2,4-BENZOTHIADIAZINES

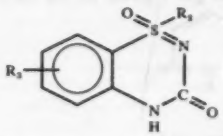
Francis Alexander Sowinski, Edison, N.J., and B. Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 411,547, Oct. 31, 1973, Pat. No. 3,926,977. This application Sept. 22, 1975, Ser. No. 615,435

Int. Cl.² C07D *285/22, 285/24*

U.S. Cl. 260—243 D **4 Claims**

1. A compound having the structure:



wherein R_2 is phenyl, or phenyl substituted with halogen, nitro, trifluoromethyl, lower alkyl or lower alkoxy; and R_3 is hydrogen, halogen, nitro, trifluoromethyl, lower alkyl or lower alkoxy.

4,022,775
3-OXOMETHYL-2-(1-NITRO-2-OXOETHYLIDENE)-TETRAHYDRO-2H-1,3-THIAZINES

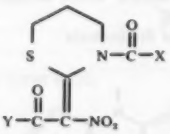
Steven A. Roman, Oakdale, Calif., and James E. Powell, Rodmersham Green near Sittingbourne, England, assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 564,258, April 2, 1975, abandoned. This application Mar. 3, 1976, Ser. No. 663,317

Int. Cl.² C07D *279/06*

U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula:



wherein X and Y each is R, R—O— or R—S—, R containing up to 30 carbon atoms and being alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkylalkyl, haloalkyl, haloalkenyl, mono- and poly-(alkoxy)alkyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl; phenyl, or phenalkyl, or any of these substituted on the ring by one to two of one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy or phenoxy; is aminoalkyl, $-(CH_s)_m-NR^1R^2$, wherein m is one or two, R^1 and R^2 is alkyl, alkenyl, cycloalkyl, phenyl or phenalkyl; or is $-(CH_2)_n-R^5$, wherein n is zero, one or two, and R^5 is heterocyclic moiety selected from furanyl, tetrahydrofuranyl, dioxolanyl, thienyl,

thiopyranyl, pyridinyl, pyrrolidinyl, morpholinyl and their -methyl and -ethyl counterparts.

4,022,776

5-[1-HYDROXY-2-(SUBSTITUTED-AMINO)]ETHYL-8-HYDROXYCARBOSTYRIL DERIVATIVES

Kazuyuki Nakagawa, Tokushima; Shiro Yoshizaki, Naruto; Kaoru Tanimura, and Shigeharu Tamada, both of Tokushima, all of Japan, assignors to Otsuka Pharmaceutical Company Limited, Tokyo, Japan

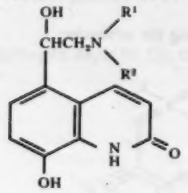
Filed Dec. 26, 1974, Ser. No. 536,705

Claims priority, application Japan, Jan. 31, 1974, 49-12953; Jan. 31, 1974, 49-12954; Feb. 5, 1974, 49-15116; Feb. 7, 1974, 49-15953; Feb. 5, 1974, 49-15115; Feb. 18, 1974, 49-19787; Feb. 27, 1974, 49-23604; Nov. 11, 1974, 49-130717; Nov. 11, 1974, 49-130718; Nov. 11, 1974, 49-130719; Nov. 11, 1974, 49-130725; Nov. 11, 1974, 49-130727; Dec. 4, 1974, 49-140339; Dec. 4, 1974, 49-140340

Int. Cl.² C07D *215/26, 413/06*

U.S. Cl. 260—247.2 A **11 Claims**

1. A 5-[1-Hydroxy-2-(substituted-amino)]-ethyl-8-hydroxycarbostyril derivative represented by the formula (I)



(I)

wherein R^1 and R^2, which may be the same or different, each represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, a phenylalkyl group containing a straight or branched chain alkyl moiety having 1 to 4 carbon atoms or a cycloalkyl group having 4 to 6 carbon atoms, or R^1 and R^2 may, when taken together with the nitrogen atom to which they are attached, form a pyrrolidine, piperidine, morpholine, or piperazine ring which can be unsubstituted or substituted with an alkyl group having 1 to 4 carbon atoms.

4,022,777

IMIDAZOQUINOXALINE FUNGICIDES

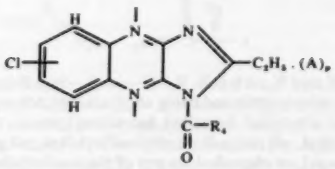
Donnie Joe Sam, Newark, Del., and Mark A. Wuonola, Cambridge, Mass., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 369,740, June 13, 1973, Pat. No. 3,919,423, which is a continuation-in-part of Ser. No. 277,604, Aug. 1, 1972, abandoned. This application Sept. 22, 1975, Ser. No. 615,495

Int. Cl.² C07D *487/04*

U.S. Cl. 260—250 Q **5 Claims**

1. A compound of the formula



wherein

R_4 is alkyl of 1 to 9 carbon atoms; alkyl of 1 to 9 carbon atoms substituted with 1 chlorine or bromine atom or 1 methoxy group; alkenyl of two to four carbon atoms; cycloalkyl of 3 to 6 carbon atoms; phenyl; phenyl substituted with 1 bromine, chlorine, or fluorine atom or 1 methyl group; 2-furoyl; benzyl; alkoxy of 1 to 6 carbon atoms; alkylthio of 1 to 6 carbon atoms; alkylamino of 1 to 6 carbon atoms; chlorosulfonylamino; or anilino;

p is 0 or 1;

A is H_2SO_4, HCl, HBr, HNO_3 or H_3PO_4.

4,022,778

10-ARYL-1,2,3,4-TETRAHYDROPYRAZINO(1,2-α)INDOLE AND DERIVATIVES THEREOF

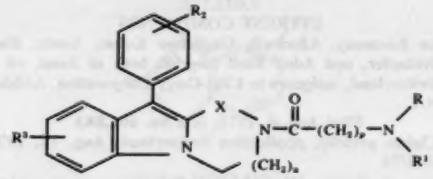
Meier E. Freed, Paoli, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Nov. 5, 1971, Ser. No. 196,178

Int. Cl.² C07D *403/06*

U.S. Cl. 260—250 BC **11 Claims**

1. A member selected from the class consisting of



wherein:

X is CH_2; R and R^1 are selected from the class consisting of hydrogen and (lower)alkyl; R and R^1 when joined together form with the nitrogen atom a saturated heterocyclic ring selected from the class consisting of piperidino, pyrrolidino, morpholino and piperazino; R^2 and R^3 are selected from the class consisting of hydrogen, (lower)alkyl, CF_3 and halo; n is a whole number from 1 to 2; and p is a whole number from 1 through 3; and the non-toxic acid addition salts thereof.

4,022,779

AMINO DERIVATIVES OF PYRIDO(3,4-b)PYRAZINE CARBOXYLIC ACIDS AND ESTERS

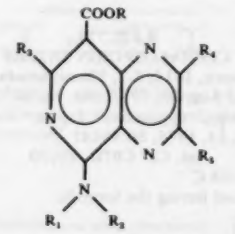
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 491,884, July 25, 1974, abandoned. This application Oct. 7, 1975, Ser. No. 620,469

Int. Cl.² C07D *471/04*

U.S. Cl. 260—250 BC **18 Claims**

1. A compound of the formula



wherein R, R_3, R_4 and R_5 each is hydrogen or lower alkyl; R_1 and R_2 each is hydrogen, lower alkyl, lower alkanoyl, di(lower alkylamino)lower alkyl, phenyl, substituted phenyl, or

is an unsubstituted or substituted heterocyclic of the group consisting of pyrrolidino, piperidino, dihydropyrimidinyl, dihydropyridazinyl or piperazino; wherein the substituted phenyl bears one or two lower alkyl, lower alkoxy, halogen, trifluoromethyl, amino or carboxy groups, and the substituted heterocyclics bear a hydroxy-lower alkyl, one or two lower alkyl or a phenyl group; and acid addition salts thereof.

4,022,780

PROCESS FOR THE MANUFACTURE OF INDOLE DERIVATIVES

Martin Doyle, and Stephen Collyer Smith, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

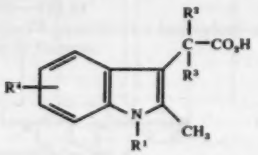
Continuation of Ser. No. 441,389, Feb. 11, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,224

Claims priority, application United Kingdom, Mar. 6, 1973, 10736/73

Int. Cl.² C07D *239/72*

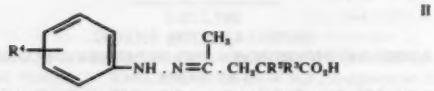
U.S. Cl. 260—256.4 Q **3 Claims**

1. A process for the preparation of a compound of the formula:



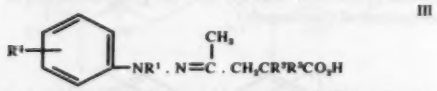
I

wherein R^1 stands for an unsubstituted quinazolin-4-yl radical or a quinazolin-4-yl radical bearing a C_{1-5}-alkyl, C_{1-5}-alkylthio or halogen substituent, and R^2 and R^3, which may be the same or different, stand for hydrogen or a methyl radical, and R^4 stands for hydrogen or a C_{1-5}-alkoxy or C_{1-5}-alkyl radical, and pharmaceutically-acceptable salts thereof, which comprises (a) reacting a compound of the formula:



II

wherein R^2, R^3 and R^4 have the meanings stated above, with at least one molecular equivalent of a compound of the formula R^1Y, wherein R^1 has the meaning stated above and Y is a chlorine, bromine or iodine atom, in the presence of a solvent selected from the group consisting of 1,2-dimethoxyethane, diethyleneglycol dimethyl ether, dioxan, diphenyl ether, tetrahydrofuran and 1,2-dichloroethane, at 0° C to 50° C so as to give a compound of the formula:



III

as its hydrochloride, hydrobromide or hydroiodide salt, respectively, and then (b) heating the hydrochloride, hydrobromide or hydroiodide salt of the compound of formula III in the presence of a compound selected from a Lewis acid; or sulfuric acid, perchloric acid, laevulinic acid, a polyphosphoric acid, formic acid or a C_{1-5} alkyl ester thereof; or a hydrogen halide, at 40° C to 160° C, and when a pharmaceutically-acceptable salt is required, reacting the acid of formula I with a base affording a pharmaceutically-acceptable cation.

4,022,781

ISOTHIOCYANOBENZOXAZOLES

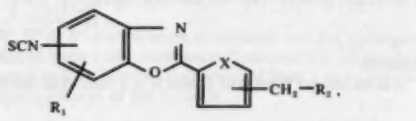
Venkatachala L. Narayanan, Hightstown; Glenn Anthony Jacobs, Princeton, and Rudiger D. Haugwitz, Titusville, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 577,587, May 15, 1975, Pat. No. 3,969,351, which is a continuation-in-part of Ser. No. 471,083, May 17, 1974, abandoned. This application Apr. 26, 1976, Ser. No. 680,316

Int. Cl.² C07D *413/14*

U.S. Cl. 260—268 BC **7 Claims**

1. A compound having the structure



or a pharmaceutically acceptable salt thereof, wherein R_1 is hydrogen, alkyl, alkoxy or halogen; X is oxygen or sulfur; and R_2 is 1-pyrrolidinyl, 1-piperidinyl, 4-alkyl-1-piperazinyl, 4-alkyl-1-piperidinyl or 3-alkyl-1-pyrrolidinyl; wherein alkyl and alkoxy are groups having 1 to 6 carbon atoms.

4,022,782

4-PIPERAZINYL DERIVATIVES OF PYRAZOLO [1,5-a]-QUINOXALINE-3-CARBOXYLIC ACIDS AND ESTERS

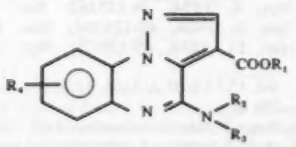
Uwe D. Treuner, Regensburg, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 628,277, Nov. 3, 1975, Pat. No. 3,994,893. This application Aug. 18, 1976, Ser. No. 715,601

Int. Cl.² C07D *487/04*

U.S. Cl. 260—268 TR **5 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen or lower alkyl;

is piperazinyl or piperazinyl substituted with a phenyl group, hydroxy-lower alkyl group or one or two lower alkyl groups;

R_4 is hydrogen, lower alkyl or halogen;

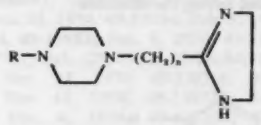
and acid addition salts thereof.

4,022,783
PIPERAZINYL-IMIDAZOLINES

James R. Shroff, Riverside, Conn., and Peter P. Cervoni, New Rochelle, N.Y., assignors to USV Pharmaceutical Corporation, Tuckahoe, N.Y.

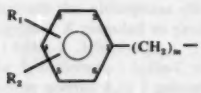
Continuation-in-part of Ser. No. 518,242, Oct. 29, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 641,966
Int. Cl.² C07D *401/04*, *401/06*
U.S. Cl. 260—268 H 11 Claims

1. A compound selected from the group consisting of compounds of the formula



wherein

n is an integer from 0 to 1, and R is a radical of the formula



wherein

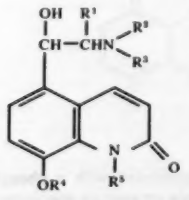
m is an integer from 0 to 1, and R_1 and R_2 are selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, hydroxy, amino, halogen and trifluromethyl and may be the same or different, with the proviso that when one of R_1 or R_2 is a branched alkyl or trifluromethyl, the other of R_1 and R_2 is hydrogen, and their pharmaceutically acceptable, non-toxic mono- and di-acid addition salts.

4,022,784
5-[1-HYDROXY-2-(SUBSTITUTED-AMINO)]ALKYL-8-SUBSTITUTED-CARBOSTYRIL AND -3,4-DIHYDROCARBOSTYRIL DERIVATIVES

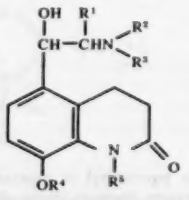
Kazuyuki Nakagawa, Tokushima; Shiro Yoshizaki, Naruto; Kaoru Tanimura, and Shigeharu Tamara, both of Tokushima, all of Japan, assignors to Otsuka Pharmaceutical Company Limited, Tokyo, Japan

Filed Dec. 26, 1974, Ser. No. 536,703
Claims priority, application Japan, Nov. 8, 1974, 49-129381; Nov. 8, 1974, 49-129382; Nov. 8, 1974, 49-129383; Nov. 8, 1974, 49-129384; Nov. 11, 1974, 49-130726; Nov. 11, 1974, 49-130727; Nov. 11, 1974, 49-130729
Int. Cl.² C07D *215/26*, *215/22*
U.S. Cl. 260—288 R 6 Claims

1. A 5-[1-hydroxy-2-(substituted-amino)] alkyl-8-substituted-carbostyril or 5-[1-hydroxy-2-(substituted-amino)] alkyl-8-substituted-3,4-dihydrocarbostyril compound represented by the formula (*Ia*) or (*Ib*)



(Ia)



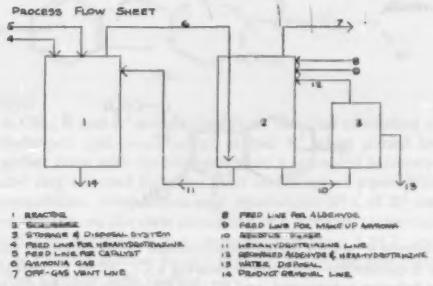
(Ib)

wherein R^1, R^4 and R^5 each represents a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, with at least one of R^4 and R^5 being an alkyl group, and R^2 and R^3, which may be the same or different, each represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, a phenyl alkyl group having a straight or branched chain alkyl moiety having 1 to 4 carbon atoms or a cycloalkyl group having 4 to 6 carbon atoms, R^2 and R^3 may, when taken together with the nitrogen atom to which they are attached, form a 5- or 6-membered heterocyclic ring which is unsubstituted or substituted with an alkyl group having 1 to 4 carbon atoms, said heterocyclic ring being selected from the group consisting of pyrrolidino, piperidino, morpholino, and piperazino, and the pharmaceutically acceptable acid addition salts thereof.

4,022,785
SUBSTITUTED PYRIDINES AND DIHYDROPYRIDINES

Bernardus A. Oude Alink, St. Louis, and Neil E. S. Thompson, Creve Coeur, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Jan. 8, 1976, Ser. No. 647,342
Int. Cl.² C07D *213/02*, *213/06*
U.S. Cl. 260—290 P 12 Claims



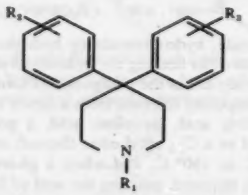
1. A process of preparing a mixture of an alkyl pyridine and an N-substituted alkyl 1,2-dihydropyridine which comprises reacting a hexahydrotriazine in the presence of a Lewis acid at a temperature between about 80° C. and 300° C. for a period of about 0.5 to 24 hours.

4,022,786
4,4-DIARYLPIPERIDINES AND PROCESS OF MAKING THE SAME

Gerhard Hackmack, Aumuhle, and Josef Klosa, Berlin, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

Continuation-in-part of Ser. No. 55,957, July 17, 1970. This application Mar. 26, 1974, Ser. No. 455,041
Claims priority, application Germany, July 17, 1969, 1936452
Int. Cl.² C07D *211/22*
U.S. Cl. 260—293.72 14 Claims

1. A physiologically-active and therapeutically-acceptable 4,4-diarylpiperidine selected from the group consisting of a) a compound of the formula



wherein

R_1 is a member selected from the group consisting of nuclearly-substituted or unsubstituted phen(lower)alkyl, nuclearly-substituted or unsubstituted phenoxy(lower)alkyl, nuclearly-substituted or unsubstituted phenyl(lower-)alkoxy(lower)alkyl and nuclearly-substituted or unsubstituted phenyloxo(lower)alkyl; each occurence of lower denoting a carbon skeleton having from 1 to 4 carbon atoms, inclusive; and any substituent of a nuclearly-substituted benzene ring being an atom of a halogen having an atomic number from 9 to 35, inclusive; and

each of

R_2 and R_3 is, independently, a member selected from the group consisting of —H and alkyl having from 1 to 4 carbon atoms, inclusive;

and

b. an acid-addition salt of (a).

4,022,787

ANTICHOLINERGIC ESTER AND SALTS THEREOF

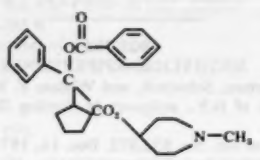
Gianluigi Soldati, Mercerville; Paul Finkelstein, Princeton Junction, both of N.J.; David A. Schlichting, Pound Ridge, N.Y., and William Oroshnik, Plainfield, N.J., assignors to Carter-Wallace, Inc., New York, N.Y.

Filed July 18, 1975, Ser. No. 597,246

Int. Cl.² C07D *211/46*

U.S. Cl. 260—293.81 **7 Claims**

1. N-methyl-4-piperidinyl α-benzoyloxy-α-cyclopentyl-phenylacetates of formula:



in the form of the free base or as a salt such as the hydrochloride, hydrobromide, hydroiodide, sulfate, acetate, phosphate, gluconate, laurate, maleate, methochloride, methobromide, methiodide, pentylbromide or dodecylbromide.

4,022,788

INDANE TETROL AMINES

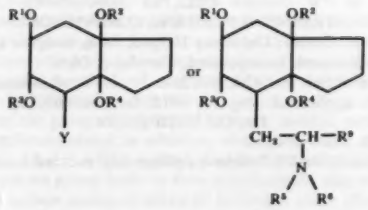
Frederic Peter Hauck, Somerville; Joyce Reid, Highland Park, and Vinayak V. Kane, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 467,033, May 6, 1974, abandoned. This application Apr. 23, 1975, Ser. No. 570,911

Int. Cl.² C07D *211/06, 295/08, 295/10*

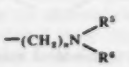
U.S. Cl. 260—293.56 **5 Claims**

1. A compound of the formula

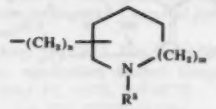


wherein

Y is a radical of the formula



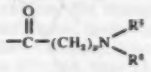
or of the formula



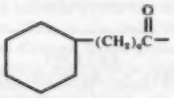
wherein $(CH_2)_n$ is a straight or branched chain alkyl radical, n is 1-6, *m* is 0 or 1 and R^5 and R^6 are the same or different and are hydrogen, alkyl of from 1 to 3 carbons, benzyl, or R^5 and R^6 together with the nitrogen to which they are attached are pyrrolidino, piperidino or N′-alkyl piperazino wherein the alkyl radical has from 1 to 3 carbons;

R^1, R^2, R^3 or R^4 are the same or different and are hydrogen; alkyl of from 1 to 4 carbons, trifluoromethyl; alkanoyl of from 1 to 4 carbons; haloalkanoyl of from 1 to 4 carbons; alkoxycarbonyl of the formula

wherein R is an alkyl radical of 1 to 4 carbons; alkoxyalkyl wherein the alkoxy group has 1 to 3 carbons and the alkyl has 1 to 3 carbons; aminoalkanoyl of the formula



wherein R^5 and R^6 are as previously defined and *p* is 0–3; 2-, 3-, or 4-pyridylcarbonyl; phenyl; monosubstituted phenyl wherein the substituent is alkyl of from 1 to 4 carbons, alkoxy of from 1 to 4 carbons, hydroxy, nitro, amino, or dialkylamino wherein each alkyl has from 1 to 4 carbons; alkenoyl of from 3 to 4 carbons; or aroyl of the formula



wherein *q* is 0–3;

and R^9 is alkyl of from 1 to 4 carbons, phenyl, hydrogen, alkyl of 1 to 4 carbons substituted by phenyl or phenoxy or by a substituted phenyl or phenoxy wherein the substituent is halogen, amino, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons or dialkylamino wherein each alkyl is from 1 to 4 carbons.

4,022,789

DICHLOROCYCLOPROPYLMETHYL-BENZAZOCINES

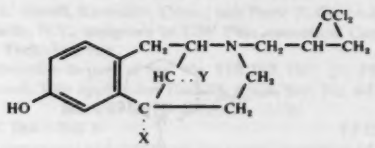
Noel F. Albertson, Schodack, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,830

Int. Cl.² C07D *221/26*

U.S. Cl. 260—293.54 **2 Claims**

1. 6-X-11-Y-3-(2,2-Dichlorocyclopropyl)methyl-1,2,3,4,5,6-hexahydro-2,6-methano-3-benzazocin-8-ol having the structural formula



wherein

X is hydrogen, methyl, ethyl, propyl, allyl or phenyl and Y is hydrogen, methyl or ethyl or an acid addition salt thereof.

4,022,790

HYDROGENATED DIELS-ALDER ADDUCTS OF BENZDIAZEPINES

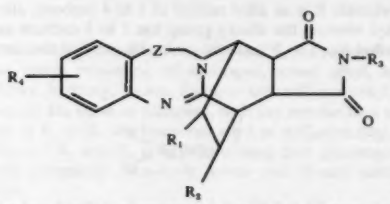
Harry L. Yale, New Brunswick, and James A. Bristol, Boonton, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 568,358, April 15, 1975, Pat. No. 3,984,418. This application July 20, 1976, Ser. No. 707,135

Int. Cl.² C07D *471/04*

U.S. Cl. 260—293.55 **10 Claims**

1. A compound having the structure



or a pharmaceutically acceptable salt thereof, wherein Z is oxygen or sulfur; R_1 is hydrogen, halogen, alkyl, aryl or arylalkyl; R_2 is hydrogen, alkyl, aryl or arylalkyl; R_3 is hydrogen, alkyl, aryl or arylalkyl; and R_4 is hydrogen, halogen, alkyl, phenyl, dialkylamidosulfonyl or trifluoromethyl; with the proviso that when R_4 is phenyl or dialkylamidosulfonyl, R_4 must be para to the oxygen or sulfur atom; wherein aryl is phenyl or phenyl substituted with halogen, alkyl or alkoxy; and alkyl and alkoxy are groups having 1 to 4 carbon atoms.

4,022,791

2-AMINOMETHYL-3,4-DIHYDRONAPHTHALENES

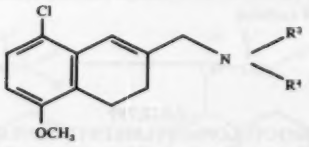
Willard M. Welch, Jr., North Stonington, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed June 3, 1975, Ser. No. 583,420

Int. Cl.² C07D *295/08*

U.S. Cl. 260—293.62 **9 Claims**

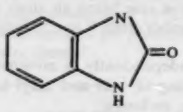
1. A compound having the formula



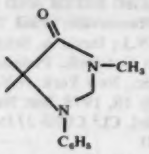
wherein the nitrogen containing ring is selected from the group consisting of morpholino, thiazolidino, pyrrolidino, piperidino, piperazino and 3,4-[dihydropiperidino] dehydropiperidino;

R^3, when taken separately, is a member selected from the group consisting of hydrogen, hydrocarbyl having up to six carbon atoms and free of triple bonds, pyrrolidino, piperidino, phenyl and phenyl substituted by Cl, Br or CF_3;

R^4, when taken separately, is a member selected from the group consisting of hydrogen, hydroxyl, alkoxy having up to four carbon atoms, alkanoyloxy having up to six carbon atoms, acetoacetoxy, alkylcarbonyl having up to four carbon atoms, carboxamido, N-alkylcarboxamido having up to seven carbon atoms and the moiety



with the proviso that when R^4 is said moiety, said nitrogen containing ring is piperidino or 3,4-dehydropiperidino and R^3 and R^4, when taken together, are



with the proviso that said nitrogen containing ring is piperidino.

4,022,792

METHYLIDENEPIPERIDINES

Noel F. Albertson, Schodack, and William F. Michne, Clifton Park, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 532,872, Dec. 16, 1974, Pat. No. 3,976,653, which is a division of Ser. No. 386,593, Aug. 8, 1973, Pat. No. 3,898,235, which is a continuation-in-part of Ser. No. 94,619, Dec. 2, 1970, Pat. No. 3,839,338, which is a continuation-in-part of Ser. No. 728,044, May 9, 1968, Pat. No. 3,639,411. This application May 27, 1976, Ser. No. 690,413

Int. Cl.² C07D *211/70*

U.S. Cl. 260—293.83 **3 Claims**

1. 1-(Q)-2-[p-(Y^5)-Phenyl-X-]-3-[(Y^3)(Y^4)methylidene]-piperidine, wherein X is $—CH_2—$ or a valence bond; Q is hydrogen, alkyl having 1–6 carbon atoms, benzyl, p-nitrophenyl, acetyl, carbethoxy, benzyloxycarbonyl, p-toluenesulfonyl, or p-nitrobenzenesulfonyl; Y^3 and Y^4 are the same or different and are hydrogen, alkyl having 1–4 carbon atoms, or phenyl; and Y^5 is hydrogen, alkyl having 1–4 carbon atoms, halo, trifluoromethyl, or alkoxy having 1–4 carbon atoms.

4,022,793

TRIAMINO PYRIDINE COMPOUNDS

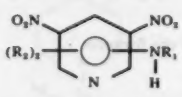
Arthur H. Gerber, University Heights, Ohio, assignor to Horizons Research Incorporated, Cleveland, Ohio

Division of Ser. No. 438,392, Jan. 31, 1974, abandoned. This application Aug. 18, 1975, Ser. No. 605,484

Int. Cl.² C07D *213/74*

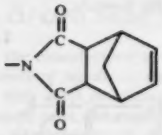
U.S. Cl. 260—294.8 F **3 Claims**

1. Substituted 3,5-dinitropyridines represented by the formula:



wherein each R_2 is a monovalent member selected from the

group consisting of H and methyl and R_1 represents a monovalent member represented by the formula $-(CH_2)_nC_6H_4X$ wherein *n* is an integer selected from the group consisting of 0, 1 and 2 and X is a meta- or para-substituent selected from the group consisting of —CN, —SO_3H, —SH, —thioalkyl, —thioaryl, —$CH{=}CHC_6H_5$, and



4,022,794

NOVEL ANALOGS OF PROSTAGLANDINS WITH 4-OXO-THIAZOLIDINYL NUCLEUS AND METHOD OF PREPARATION THEREOF

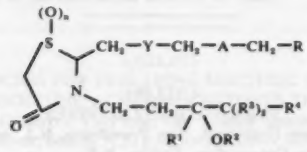
Robert L. Smith, Lansdale; Ta-Jyh Lee, Hatfield, and Edward J. Cragoe, Jr., Lansdale, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 24, 1976, Ser. No. 689,318

Int. Cl.² C07D *401/02, 277/02*

U.S. Cl. 260—295 R **39 Claims**

1. The compound of the formula



wherein

R is carboxy, a carboxy salt, or derivatized carboxy;

A is selected from the group consisting of methylene and oxygen;

Y is selected from the group consisting of ethylene, vinylene, and ethynylene;

n is 0, 1, or 2;

R^1 is hydrogen or methyl;

R^2 is hydrogen or lower alkanoyl of from 1–5 carbon atoms;

R^3 is hydrogen or methyl; and

R^4 is alkyl, branched chain alkyl of from 3–6 carbon atoms, 4,4,4-trifluorobutyl, or OR^{4a} wherein R^{4a} is alkyl, branched alkyl of from 2–5 carbon atoms, substituted alkyl including 3,3,3-trifluoropropyl, 5- or 6-membered heterocyclic ring containing nitrogen or oxygen, including pyridyl, or furfuryl, or phenyl in which the phenyl ring can be substituted with one or two substituents selected from the group consisting of halogen, methyl, methoxy, or trifluoromethyl; in addition, when R^4 is lower straight chain alkyl and R^1 is methyl, the terminal carbon atom of R^4 can be joined to R^1 to form a carbocyclic ring of from 6–9 carbon atoms, or when R^4 is straight chain alkyl and R^1 is hydrogen, the terminal carbon atom of R^4 can be joined to the carbon atom bearing OR^2 to form a carbocyclic ring of from 5–8 carbon atoms;

also, when R^1, R^2, and R^3 are hydrogen, R^4can be a straight chain alkyl such that the terminal carbon atom of R^4 can be joined to the hydroxyl group oxygen atom to form a cyclic ether containing 5- or 6-membered atoms.

4,022,795

METHOD FOR DEHALOGENATING AROMATIC COMPOUNDS

Peter Bamfield, and Peter Michael Quan, both of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 19, 1975, Ser. No. 605,890

Claims priority, application United Kingdom, Sept. 17, 1974, 40420/74; May 15, 1975, 20618/75

Int. Cl.² C07D *401/04*

U.S. Cl. 260—296 D **13 Claims**

1. A process for removing chlorine or bromine atoms without removing fluorine atoms from a compound selected from the group consisting of chlorobenzene, bromobenzene, 1-chloro-2-nitrobenzene, 5-chloro-2-aminobenzotrifluoride, 2,5-dichloronitrobenzene, 2-chloropyridine, 4-chloropyridine, 4-bromo-2,6-dimethylaniline, 1-chloronaphthalene, 1,2-dichlorobenzene, 4-bromobiphenyl and 2,6-difluoro-4-bromoaniline which comprises contacting said compound with an aqueous solution of a formic acid salt in the presence of a palladium-on-carbon hydrogenation catalyst and a surface active agent selected from the class consisting of water soluble salts of long chain carboxylic acids and sulphate esters, sodium diisopropylnaphthalene sulphonate, quaternary ammonium salts of long chain amines and polyalkenoxy derivatives of phenols and amines.

4,022,796

2,3-DIHYDRO-N-(5-METHYL-3-ISOXAZOLYL)-3-OXO-1,2-BENZOTHIAZOLE-2-ACETAMIDE 1,1-DIOXIDE

Arthur C. Fabian, Flanders; Jerome D. Genzer, Livingston; Charles Francis Kasulanis, Hopatcong; John Shavel, Jr., Mendham, and Harold Zinnes, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 577,568, May 21, 1975, Pat. No. 3,957,772. This application Dec. 29, 1975, Ser. No. 644,986

Int. Cl.² C07D *275/06*

U.S. Cl. 260—301 **1 Claim**

1. 2,3-Dihydro-N-(5-methyl-3-isoxazolyl)-3-oxo-1,2-benzisothiazole-2-acetamide 1,1-dioxide.

4,022,797

CERTAIN THIAZOLE, ISOTHIAZOLE, OXAZOLE, AND ISOXAZOLE COMPOUNDS

Graham John Durant, Welwyn Garden City; John Colin Emmett, Codicote, and Charon Robin Ganellin, Welwyn Garden City, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

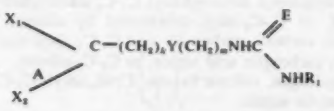
Division of Ser. No. 450,957, March 14, 1974, Pat. No. 3,950,333, which is a continuation-in-part of Ser. No. 290,584, Sept. 20, 1972, abandoned, which is a continuation-in-part of Ser. No. 230,451, Feb. 29, 1972, abandoned. This application Dec. 4, 1975, Ser. No. 637,496

Claims priority, application Ireland, Feb. 3, 1972, 136/72

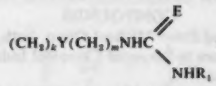
Int. Cl.² C07D *277/30*

U.S. Cl. 260—302 R **10 Claims**

1. A compound of the formula:



wherein A is such that there is formed together with the carbon atom shown an unsaturated heterocyclic nucleus, said unsaturated heterocyclic nucleus being a thiazole, isothiazole, oxazole or isoxazole ring; X_1 is hydrogen, lower alkyl, hydroxyl, trifluoromethyl, benzyl, halogen, amino or



X_2 hydrogen or when X_1 is lower alkyl, lower alkyl or halogen; k is 0 to 2 and m is 2 or 3, provided that the sum of k and m is 3 or 4; Y is oxygen, sulphur or NH; E is NR_2; R_1 is hydrogen, lower alkyl or di-lower alkylamino-lower alkyl; and R_2 is hydrogen, nitro or cyano, or a pharmaceutically acceptable addition salt thereof.

4,022,798

2-(5-PHENYL-2-FURYL)IMIDAZOLINES

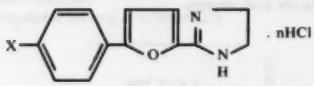
Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 10, 1976, Ser. No. 684,723

Int. Cl.² C07D *405/04*

U.S. Cl. 260—309.6 **3 Claims**

1. A compound of the formula:



wherein X represents amino or nitro and n is 2 or 1, respectively.

4,022,799

NAPHTHOLACTAM DYESTUFFS

Horst Harnisch, Cologne, and Alfred Brack, Odenthal, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

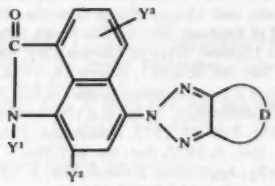
Division of Ser. No. 363,989, May 25, 1973, Pat. No. 3,950,347. This application Aug. 21, 1975, Ser. No. 606,582

Claims priority, application Germany, May 26, 1972, 2225648

Int. Cl.² C07D *249/16*

U.S. Cl. 260—308 B **6 Claims**

1. Naphtholactam dyestuff of the formula



wherein

Y^1 is hydrogen, C_1-C_3-alkyl, benzyl, C_1-C_2-alkylbenzyl, chlorobenzyl, C_1-C_2-alkoxybenzyl, cyanobenzyl, phenyl, C_1-C_2-alkylphenyl, chlorophenyl, C_1-C_2-alkoxyphenyl, cyclohexyl, or C_1-C_3-alkyl substituted by chloro, hydroxy, cyano, carboxy, carboxylic acid C_1-C_4-alkyl ester, benzyl ester, carboxylic acid amide, or C_1-C_3-alkoxy;

Y^2 is hydrogen, chloro, bromo, C_1-C_3-alkyl, C_1-C_1-alkoxy, amino, or sulpho;

Y^1 and Y^2, when taken together are trimethylene;

Y^3 is hydrogen, or C_1-C_2-alkoxy; and

D is the remaining portion of acenaphthene anthracene, benzindole, benz(dihydro) indole, phenanthrene, pyrene, or any of said rings substituted by 1–2 sulphonic acid groups.

4,022,800

2-PYRAZOLYL-BENZOPHENONES

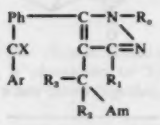
Heinz Werner Gschwend, New Providence, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 475,475, June 3, 1974, Pat. No. 3,939,271. This application Aug. 28, 1975, Ser. No. 608,796

Int. Cl.² C07D *231/12, 295/00, 401/00*

U.S. Cl. 260—310 R **5 Claims**

1. A compound of the formula



wherein Ph is 1,2-phenylene and Ar is phenyl, both of said radicals are unsubstituted or substituted by one or two, of the same or different substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and trifluoromethyl, R_o is hydrogen, lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, amino-lower alkyl, lower alkylamino-lower alkyl, di-lower alkylamino-lower alkyl, Ar or Ar-lower alkyl, Am is amino, mono- or di-lower alkylamino, wherein the additional chain-nitrogen, or oxygen atom is separated from the ring-nitrogen by at least 2 carbon atoms, each of R_1, R_2, and R_3 is hydrogen or lower alkyl, and X is oxo or thio; simple or mixed, open or cyclic lower alkyl or alkylene ketals thereof; or a pharmaceutically acceptable acid addition salt thereof.

4,022,801

PYRAZOLOBENZAZEPINES

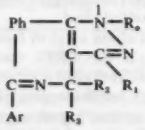
Heinz Werner Gschwend, New Providence, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 475,474, June 3, 1974, Pat. No. 3,947,585. This application May 5, 1975, Ser. No. 574,211

Int. Cl.² C07D *471/00*

U.S. Cl. 260—310 R **5 Claims**

1. A compound of the formula



wherein Ph is 1,2-phenylene and Ar is phenyl, both of said radicals are unsubstituted or substituted by one or two, of the same or different substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and trifluoromethyl, R_o is hydrogen, lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, amino-lower alkyl, lower alkylamino-lower alkyl, di-lower alkylamino-lower alkyl, Ar or Ar-lower alkyl, wherein the additional chain-nitrogen or oxygen atom is separated from the ring-nitrogen by at least 2 carbon atoms, each of R_1 and R_2 is hydrogen or lower alkyl, and R_3 is hydrogen, lower alkyl, hydroxy or lower alkanoyloxy; or N-oxides thereof; or pharmaceutically acceptable acid addition salts thereof.

4,022,802
PROCESS FOR THE MANUFACTURE OF N-SUBSTITUTED INDOLES

Robert Garner, Ramsbottom Bury, England, and Max Dünnenberger, Frenkendorf, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation-in-part of Ser. No. 306,754, Nov. 15, 1972, abandoned. This application May 12, 1975, Ser. No. 576,751

Claims priority, application Switzerland, Nov. 26, 1971, 17240/71

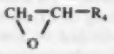
Int. Cl.² C07D *209/04, 209/10*

U.S. Cl. 260—319.1 **6 Claims**

1. A process for the manufacture of N-substituted indoles, which comprises treating indole or mono- or disubstituted indole substituted with alkyl or alkoxy with 1 to 4 carbon atoms, halogen, phenyl, tolyl, chlorophenyl or methoxyphenyl with non-aqueous alkali hydroxide in dimethyl sulfoxide, dimethyl formamide or dimethyl acetamide, and subsequently reacting with an alkylating agent which is a member selected from the group consisting of an alkyl halide with up to 18 carbon atoms, an alkenyl halide with up to 18 carbon atoms, a benzyl halide, an alkene of the formula

$$CH_2 = CH - Y$$

in which Y is cyano, carboxy or carbalkoxy with 1 to 4 carbon atoms in the alkoxy radical, and an epoxide of the formula



in which R_4 is alkyl with 1 to 4 carbon atoms or halogenalkyl with 1 to 4 carbon atoms, whereby 100% to 150% of the stoichiometrically requisite amount of the alkylating agent is used and the process is carried out at temperatures of up to 50° C and in the substantial absence of water.

4,022,803
PROCESS FOR PREPARING ISOCITRIC ACID, ALLOISOCITRIC ACID AND LACTONES THEREOF

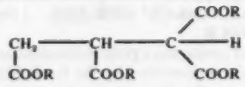
Eddie N. Gutierrez, Fort Lee, and Vincent Lamberti, Upper Saddle River, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,839

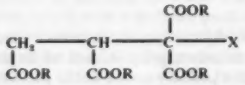
Int. Cl.² C07D *307/32;* **C07C** *51/09*

U.S. Cl. 260—343.6 **14 Claims**

1. A process for preparing a mixture of isocitric acid, alloisocitric acid and gamma lactones of isocitric acid and alloisocitric acid comprising halogenating a tetraester compound of the formula



wherein R independently represents methyl and/or ethyl, in an aqueous medium, with a hypohalous acid selected from the group consisting of hypochlorous acid and hypobromous acid to form a halogenated tetraester of the formula



wherein X represents chlorine or bromine and said R is as previously defined; and hydrolyzing said halogenated tetraester in an aqueous medium with a non-oxidizing mineral acid to form said mixture.

4,022,804
PROCESS FOR THE PRODUCTION OF BROMO SUBSTITUTED TETRAHYDROFURAN SULFONES

Walter Boell, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 16, 1975, Ser. No. 596,305

Claims priority, application Germany, July 22, 1974, 2435098

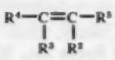
Int. Cl.² C07D *309/02*

U.S. Cl. 260—345.1 **7 Claims**

1. A process for the manufacture of bromo-tetrahydrofurans which comprises subjecting a sulfonic acid bromide of the formula I

$$R^1SO_2Br \quad (I)$$

where R^1 is alkyl of 1–16 carbon atoms or alkyl of 1–16 carbon atoms substituted by fluorine, chlorine, bromine, methoxy, ethoxy, propoxy, cyano, nitro, cycloalkyl of 3–8 carbon atoms, phenyl, or phenyl substituted by chloro, methyl, nitro, or methoxy; or R^1 is cycloalkyl of 3–8 carbon atoms, m-carboxyphenyl, a mononuclear of polynuclear carbocyclic aromatic radical, or said aromatic radical substituted by methyl, methoxy, trifluoromethyl, chlorine, bromine, fluorine, nitro or bromosulfonyl, to an addition reaction at a temperature of 10° to 50° C with a substantially equal molar amount of an unsaturated compound of formula (II)



(II)

wherein R^4 and R^5 respectively are hydrogen and R^2 and R^3 together with the unsaturated carbon atoms to which they are linked in formula (II) represent a 2,5-dihydrofuran ring, or said ring substituted by one or two alkyl groups of 1–3 carbon atoms or by one or two alkoxy groups of 1–3 carbon atoms in the presence of hydrogen peroxide or an organic hydroperoxide in an amount of 0.5 to 20 mol percent, based on the amount of said sulfonic acid bromide employed, to produce a 3-sulfone-4-bromo-tetrahydrofuran compound in which the 3-sulfone group bears the radical R^1.

4,022,805
8-HALO-DIBENZOFURAN-3-ACETIC ACIDS AND CERTAIN ESTERS THEREOF

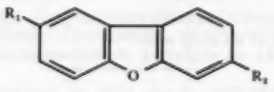
Leo Berger, Montclair, and Robert August Schmidt, Wallington, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 448,853, March 7, 1974, abandoned. This application Feb. 10, 1975, Ser. No. 548,658

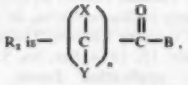
Int. Cl.² C07D *307/91*

U.S. Cl. 260—346.2 M **7 Claims**

1. A compound of the formula



wherein R_1 is halogen;

R_2 is  ,

wherein B is hydroxy, lower alkoxy, or di-lower alkylamino-lower alkoxy, X is hydrogen and y is hydrogen or lower alkyl; and n is 1

when X and Y are different, an enatiomer; when B is hydroxy

a salt thereof with a pharmaceutically acceptable base; or when B is di-lower alkylamino lower alkoxy, an addition salt thereof with a pharmaceutically acceptable acid.

4,022,806

PROCESS FOR PREPARING CHENODEOXYCHOLIC ACID

Henry Francis Frost, Hemel Hempstead; Fritz Fabian, Welwyn Garden City; Christopher James Sharpe, Harrow Weald, and William Arthur Jones, Staines, all of England, assignors to The Union International Company Ltd., England

Filed Dec. 23, 1975, Ser. No. 643,902

Claims priority, application United Kingdom, Dec. 23, 1974, 55575/74

Int. Cl.² C07J *9/00*

U.S. Cl. 260—397.1 **25 Claims**

1. A process for the purification of crude chenodeoxycholic acid which comprises forming a mixture of methanol, the crude acid, a base and a calcium or strontium salt, whereby the crystalline calcium or strontium salt of chenodeoxycholic acid is precipitated, separating the salt, dissolving it in a solution of acetic acid or propionic acid, diluting this solution with water to precipitate the free acid in purified form and recovering the purified acid.

4,022,807

VITAMIN A ESTERS

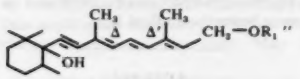
Gary Lee Olson, Westfield, and Gabriel Saucy, Essex Fells, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 464,398, April 26, 1974, Pat. No. 3,928,400, and a continuation-in-part of Ser. No. 303,162, Nov. 2, 1972, abandoned. This application Aug. 11, 1975, Ser. No. 603,480

Int. Cl.² C09F *5/08, 7/10*

U.S. Cl. 260—410 **9 Claims**

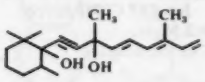
1. A process for producing a compound of the formula:



wherein

R_1'' is alkanoyl containing from 2 to 18 carbon atoms or aroyl and Δ represents a cis configuration; and Δ′ represents a trans configuration;

comprising treating a compound of the formula:



with an organic acid selected from the group consisting of an alkanoic acid or an aroic acid.

4,022,808

PROCESS FOR THE PRODUCTION OF ALKYLENE GLYCOL ETHER OF ORGANIC CARBOXYLIC ACID

Hiroshi Yoshihara; Takashi Tobita; Ryoichi Tomizawa, all of Ichihara, and Kunio Ishikawa, Chiba, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

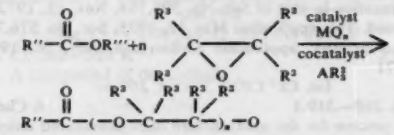
Filed Nov. 15, 1974, Ser. No. 524,156

Claims priority, application Japan, Nov. 19, 1973, 48-129937; Nov. 19, 1973, 48-129938

Int. Cl.² C09F *5/08, 7/10*

U.S. Cl. 260—410.6 **3 Claims**

1. A process for the production of an alkylene glycol ether ester of an organic acid which comprises the step of reacting an alkylene glycol ether with an organic carboxylic acid ester in accordance with the following reaction equation:



wherein

R'' is a substituted or non-substituted hydrocarbon having 1 to 20 carbon atoms or a hydrogen atom;

R''' is a substituted or non-substituted hydrocarbon having 1 to 20 carbon atoms;

R^2 are each the same or different substituted or non-substituted hydrocarbon having 1 to 10 carbon atoms or a hydrogen atom;

MQ_n is a basic catalyst wherein M is a metallic atom selected from the group consisting of Zn, Al, Ti, Sn and Fe, n is an integer corresponding to the valency of M, when M is Al or Sn, Q is simultaneously the same or different groups X, R, OR, SR, NR_2 or PR_2, when M is Zn or Ti, Q is simultaneously the same or different groups X, R or OR, and when M is Fe, Q is X, and wherein X is a halogen atom selected from the group consisting of Cl, Br and I, and R is the same or different substituted or non-substituted hydrocarbon having 1 to 20 carbon atoms or a hydrogen atom; and

AR_3^2 is a cocatalyst wherein A is nitrogen, phosphorus, antimony, arsenic or bismuth, R^2 is the same or different atoms or groups of halogens, hydrogen or substituted on non-substituted hydrocarbon groups having 1 to 20 carbon atoms wherein two of R^2 may form a cyclic hydrocarbon and at least one of R^2 is a hydrocarbon.

4,022,809

PROCESS FOR THE PREPARATION OF POLY-N-ALKYLIMINOALANES

Salvatore Cucinella, San Donato Milanese; Giovanni Dozzi, Milano, and Alessandro Mazzei, San Donato Milanese, all of Italy, assignors to Snam Progetti S.p.A., Milano, Italy

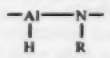
Filed Nov. 15, 1974, Ser. No. 524,312

Claims priority, application Italy, Nov. 29, 1973, 31857/73

Int. Cl.² C07F *5/06*

U.S. Cl. 260—448 R **5 Claims**

1. A process of preparing a poly-N-alkyliminoalane containing repeated units represented by the formula



in which R is an aliphatic, cycloaliphatic or aromatic radical, which consists in reacting an alanate of an alkali or alkali-earth metal with a primary amine in the presence of a solvent selected from the aliphatic, cycloaliphatic and aromatic hydrocarbons, in an inert atmosphere, in the temperature range of from −20° to 250° C and in the pressure range of from atmospheric pressure to the vapor pressure of said solvent under the process conditions.

4,022,810

METAL CHRYSOTILE METHANE SYNTHESIS CATALYST

Thaddeus P. Kobylinski, and Harold E. Swift, both of Gibsonia, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,207
Int. Cl.[2] C07C *1/04*, *1/02*
U.S. Cl. 260—449.6 M 9 Claims

1. A process for the production of methane which comprises:

contacting a charge stock comprising hydrogen and at least one carbon oxide selected from the group consisting of CO and CO_2 wherein the molar ratio of hydrogen to combined carbon oxides is at least 2:1 under methanation conditions with a catalyst comprising a metal silicate characterized as having repeating units having the structural formula:

$$[(1-x)Ni^{+2} + xMg^{+2}]_3(OH_4)Si_2O_5 \cdot wH_2O$$

where x is a number from 0.01 to 0.6, this number expressing the atomic fraction of the metals nickel and magnesium, and w is a number ranging from 0 to 4.

4,022,811

PREPARATION OF ALKYL PERBROMATES

Kurt Baum, Pasadena, Calif.; Charles D. Beard, Yorktown Heights, N.Y., and Vitautas Grakaukas, Arcadia, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 21, 1976, Ser. No. 650,829
Int. Cl.[2] C07C *71/00*
U.S. Cl. 260—453 RX 3 Claims

1. A composition of matter of the formula $XBrO_4$ wherein X = $(CH_3)_3CH$, and $(CH_3)_2C_3H_3$.

4,022,812

FIRE RESISTIVE PLASTICIZER AND METHOD

Jean-Pierre Regeaud, Boulogne (Seine); Emile Trebillon, Neuilly (Seine), and Georges Wetroff, Le Thillay, all of France, assignors to Rhone-Progil, Paris, France

Continuation of Ser. No. 258,491, June 1, 1972, abandoned. This application June 20, 1974, Ser. No. 481,039
Claims priority, application France, June 10, 1971, 71.21052
Int. Cl.[2] C07C *143/68*
U.S. Cl. 260—456 P 11 Claims

1. A process for the production of a fire resistive primary plasticizer containing 15–70% by weight chlorine and 1–8% by weight sulphur comprising subjecting a cut of substantially straight chain paraffins containing from 10 to 18 carbon atoms in succession of separate reactions consisting of a sulfochlorination reaction in which the paraffins are reacted with sulphur dioxide and chlorine in the ratio of 1 mol Cl_2 per 1–5 mols SO_2, a chlorination reaction in which the product of the reaction of the sulfochlorination step is reacted with chlorine, and a condensation reaction in which the product of the chlorination step is condensed in the presence of a basic reagent with a phenolic compound selected from the group consisting of phenol and substituted phenols wherein the substituent is halogen, alkyl, alkoxy, aryl or carboxylato, with the basic reagent present in the mol ratio of 1–1.5 mols basic reagent per mol of phenolic compound.

4,022,813

METHOD FOR THE PREPARATION OF SALTS OF CARBONIC ACID MONOESTERS

Carlo Neri, and Gioacchino Cipriani, both of San Donato Milanese, Italy, assignors to ANIC, S.p.A., Palermo, Italy

Filed Dec. 10, 1975, Ser. No. 639,443
Claims priority, application Italy, Dec. 10, 1974, 30339/74
Int. Cl.[2] C07C *68/00*
U.S. Cl. 260—463 8 Claims

1. A method for the preparation of a salt of a monoester of carbonic acid having the formula:

$$(ROC\overset{O}{\overset{\|}{O}})_x Me$$

wherein R is alkyl, Me is a metal belonging to one of Groups IA, IIA, IIIA and IIB of the Periodic Table and x is 1, 2 or 3, which consists in reacting the corresponding alcohol with carbon dioxide and a halide of said metal, in the presence of a nitrogenous base.

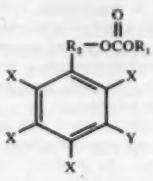
4,022,814

IODINE CONTAINING ORGANIC CARBONATES FOR USE AS RADIOGRAPHIC AGENTS

Barry N. Newton, West Lafayette, Ind., assignor to Lafayette Pharmacal, Inc., Lafayette, Ind.

Continuation-in-part of Ser. No. 501,169, Aug. 28, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,393
Int. Cl.[2] C07C *69/96*
U.S. Cl. 260—463 19 Claims

1. A compound of the formula:



wherein R_1 is a lower alkyl group consisting of straight or branched chains having from 4 to 10 carbon atoms, wherein R_2 is a lower alkylene chain linking the aromatic ring to the carbonate by 1 to 3 carbon atoms and having attached thereto a constituent selected from the group consisting of hydrogen and alkyl groups with 1 to 4 carbon atoms, X is selected from the group consisting of hydrogen and iodine, and Y is selected from the group consisting of hydrogen, iodine and amine when X is iodine and is iodine when X is hydrogen.

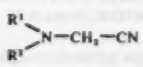
4,022,815

MANUFACTURE OF SUBSTITUTED GLYCINONITRILES

Helmut Schlecht, Ludwigshafen; Harry Distler, Bobenheim, and Erwin Hartert, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Jan. 16, 1976, Ser. No. 649,582
Claims priority, application Germany, Jan. 29, 1975, 2503582
Int. Cl.[2] C07C *121/44*
U.S. Cl. 260—465.5 A 8 Claims

1. A process for the manufacture of an N-alkylglycinonitrile of the formula



I,

wherein R^1 and R^2 are identical or different and each is alkyl

of 1 to 8 carbon atoms, R^2 may also be hydrogen, and each of R^1 and R^2 as alkyl may also be substituted by alkyl or alkoxy of 1 to 4 carbon atoms each, which comprises reacting an N-alkylamine of the formula

II,

wherein R^1 and R^2 have the above meaning, with formaldehyde and hydrocyanic acid in the presence of water for from 0.1 to 4 hours at from 0° C. to 40° C., the concentration of hydrocyanic acid during the reaction being not more than 0.1% by weight, based on the reaction mixture.

4,022,816

PURIFICATION OF CHLOROBUTYRONITRILE

Edward G. Woods, Seabrook, Tex.; Lawrence H. Shepherd, Jr., and Eric P. Breidenbach, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed May 2, 1975, Ser. No. 573,940

Int. Cl.² C07C *120/04*

U.S. Cl. 260—465.7 **6 Claims**

1. A process for producing chlorobutyronitrile which comprises:

1. reacting 1-chloro-3-bromopropane with an alkali metal cyanide in an aqueous system in the presence of from about 0.005 to about 10.0 mol percent of a catalyst of the formula $(R)_4MX$ wherein M is a Group V-A element; one, two or three of the R groups are lower alkyl having from 1 to about 4 carbon atoms or phenyl; each of the other R groups is alkyl having from 2 to about 20 carbon atoms or phenyl; X is chlorine, iodine, bromine, or a hydroxyl group, at a temperature of from about 50 to about 200° C whereby a mixed aqueous-organic system containing chlorobutyronitrile contaminated with bromobutyronitrile, $(R)_4MX$ and residual 1-chloro-3-bromopropane is produced;
2. separating the product from 1 into aqueous and organic phases providing an organic phase system containing chlorobutyronitrile, by-product bromobutyronitrile, $(R)_4MX$ and unreacted 1-chloro-3-bromopropane;
3. washing the organic phase system obtained at step 2 with water to remove at least a portion of the $(R)_4MX$ contained therein,
4. distilling off residual 1-chloro-3-bromopropane from the washed organic phase system obtained at step 3 providing a distillation product containing chlorobutyronitrile contaminated with by-product bromobutyronitrile,
5. treating the distilled product from 4 with aqueous alkali metal chloride in the presence of $(R)_4MX$ to convert by-product bromobutyronitrile to chlorobutyronitrile,
6. separating the mixture from 5 into aqueous and organic phases provided an organic phase system containing purified chlorobutyronitrile and $(R)_4MX$, and
7. water washing the chlorobutyronitrile containing organic phase from 6 to remove $(R)_4MX$ therefrom.

4,022,817

ESTERS PREPARED FROM DIACYLIUM COMPLEXES OF TETRAHALOTEREPHTHALIC ACID

James O. Knobloch, Naperville, Ill., and Fausto Ramirez, Goshen, Va., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 477,668, June 10, 1974, Pat. No. 3,953,481. This application Sept. 15, 1975, Ser. No. 613,472

Int. Cl.² C07C *67/00, 69/76*

U.S. Cl. 260—475 R **7 Claims**

1. The method of forming a tetrahaloterephthalic acid ester which comprises reacting a diacylium sulfate complex of a tetrahaloterephthalic acid with a hydroxy compound.

4,022,818

4r-AMINO-1t-PHENYL-1c-ETHOXY-CARBONYL-CYCLOHEXENES-(2) AND PROCESS FOR THEIR PREPARATION

Gerhard Satzinger, Denzlingen, and Manfred Herrmann, Gundelfingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

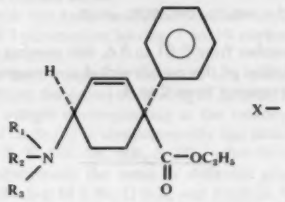
Division of Ser. No. 383,421, July 21, 1973, Pat. No. 3,905,978, which is a continuation-in-part of Ser. No. 226,509, Feb. 15, 1972, Pat. No. 3,957,851. This application June 10, 1975, Ser. No. 585,439

Claims priority, application Germany, Feb. 18, 1971, 2107871

Int. Cl.² C07C *101/38*

U.S. Cl. 260—471 A **3 Claims**

1. A quaternary compound of the formula:



wherein R_1 and R_2 are the same or different and are hydrogen or alkyl of 1 to 4 carbons or one of the two groups is allyl, phenalkyl of 7 to 9 carbon atoms or α-methyl-β-hydroxyethyl, R_3 is alkyl of 1 to 4 carbon atoms and wherein X is a halide or acetate anion.

4,022,819

PROCESS FOR PREPARING CONDENSATION PRODUCTS OF PHENOLS AND ACETOACETIC ACID ESTERS

Otto Mauz, Liederbach, Taunus; Norbert Mayer, Augsburg, and Günther Nowy, Gersthofen, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

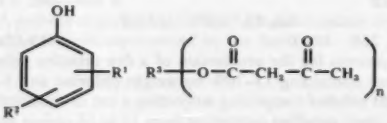
Filed Dec. 22, 1975, Ser. No. 643,345

Claims priority, application Germany, Dec. 27, 1974, 2461608

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 S **1 Claim**

1. A process for preparing a condensation product of a phenol of formula I and an acetoacetic acid ester of formula II



I II

wherein R^1 and $-R^2$ are hydrogen atoms or identical or different alkyl radicals having of from 1 to 4 carbon atoms and R^3 is a saturated straight chain or branched aliphatic, aromatic, araliphatic or cycloaliphatic hydrocarbon radical having of from 1 to 12 carbon atoms and n is an integer of from 1 to 4, in the presence of gaseous hydrogen chloride at a temperature of from −10° to +15° C, which comprises carrying out the condensation in the presence of from 5 to 30% by weight, calculated on acetoacetic acid ester used, of an n-alkyl mercaptan having of from 8 to 20 carbon atoms.

4,022,820

SOLIDIFICATION AND CRYSTALLIZATION OF MATERIALS

Anders A. Johnson, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Filed Nov. 12, 1974, Ser. No. 523,094
Int. Cl.² C07C 69/76
U.S. Cl. 260—475 B 32 Claims

1. Process for solidifying and crystallizing liquid material which comprises

a. feeding liquid material into solidification and crystallization means; whereby
b. said material contacts an agitated, fluidized bed of solid particles of said material; thereby
c. dispersing said liquid material within said bed while removing heat of crystallization from said liquid material; thereby
d. causing said fluidized particles to become coated with said dispersed liquid material;
e. providing a continually replenished bed of fluidized particles by the action of shearing forces within said bed; and
f. allowing the level of said bed to rise as new particles are formed; and
g. collecting solidified, crystallized product by allowing coated particles to overflow said solidification and crystallization chamber.

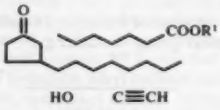
4,022,821

15-SUBSTITUTED PROSTANOIC ACID

Donald Peter Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 462,006, April 18, 1974, which is a continuation-in-part of Ser. No. 383,007, July 26, 1973, Pat. No. 3,922,302. This application Apr. 17, 1975, Ser. No. 569,026
Int. Cl.² C07C 177/00
U.S. Cl. 260—514 D 2 Claims

1. A compound of the formula:



wherein R^1 is hydrogen, alkyl of from 1 to about 6 carbon atoms, alkali metal, or a pharmacologically acceptable cation derived from ammonia or a basic amine.

4,022,822

PROCESS FOR PREPARING SORBIC ACID

Yoshiaki Tsujino, Toyonaka; Masahiko Miyashita, Hirakata, and Tokio Hashimoto, Ibaraki, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 22, 1975, Ser. No. 570,515
Claims priority, application Japan, Apr. 30, 1974, 49-49310; Aug. 1, 1974, 49-89228
Int. Cl.² C07C 51/00
U.S. Cl. 260—526 N 6 Claims

1. A process for preparing sorbic acid which comprises contacting γ-vinyl-γ-butyrolactone with an acid selected from the group consisting of mineral acids, aromatic sulfonic acids, aliphatic sulfonic acids and halogenated carboxylic acids or an acidic cation-exchange resin at a temperature of 30° to 150° C and recovering the resulting sorbic acid.

4,022,823

CITRIC ACID AND CITRAMALIC ACID PREPARATION

John B. Wilkes, Richmond, and Robert G. Wall, Pinole, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 491,987, July 29, 1974, abandoned, which is a continuation-in-part of Ser. No. 303,730, Nov. 6, 1972, abandoned, which is a continuation-in-part of Ser. No. 150,859, June 1, 1971, abandoned. This application Apr. 26, 1976, Ser. No. 680,396
Int. Cl.² C07B 3/00
U.S. Cl. 260—531 R 48 Claims

1. A process for the preparation of citric acid which comprises contacting an unsaturated compound selected from 3-methylene-1,5-pentanediol and its esters and formals with a nitric acid solution in an amount of 2 to 50 mols of nitric acid feed per mol of unsaturated compound feed, and at least 0.005 mol percent nitrogen dioxide based on nitric acid, at a temperature between −10° and 120° C, to thereby oxidize said unsaturated compound to citric acid.

33. A process for the preparation of citramalic acid which comprises contacting an unsaturated compound selected from 3-methyl-3-buten-1-ol and its esters and formals with a nitric acid solution in an amount of 2 to 50 mols of nitric acid feed per mol of unsaturated compound feed, and at least 0.005 mol percent nitrogen dioxide based on nitric acid, at a temperature between −10° and 120° C., to thereby oxidize said unsaturated compound to citramalic acid.

4,022,824

PERFLUOROCARBOXYLIC ACIDS FROM CARBOXYLIC ACIDS AND PERFLUOROCARBOXYLIC ACID FLUORIDES

William V. Childs, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 2, 1975, Ser. No. 583,316
Int. Cl.² C07C 53/18, 53/34
U.S. Cl. 260—539 A 10 Claims

1. A process comprising contacting under reaction conditions a mono- or dicarboxylic acid containing 2 to 10 carbon atoms, and a perfluorocarboxylic acid fluoride containing 2 to 10 carbon atoms to give a perfluorocarboxylic acid and an acyl fluoride.

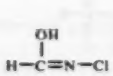
4,022,825

IMIDOL ISOMER OF N-CHLOROFORMAMIDO AND ITS PROCESS OF PREPARATION

Clifford L. Coon, Menlo Park, Calif., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed July 16, 1973, Ser. No. 379,768
Int. Cl.² C07C 119/18
U.S. Cl. 260—543 A 2 Claims

1. The tautomeric imidol isomer of N-chloroformamide repesented by the formula



2. A method for preparing the imidol isomer of N-Chloroformamide comprising reacting formamide with t-butylhypochloride in an organic solvent.

4,022,826

PRODUCTION OF BETA-HALOGENOFORMYL-ETHYL PHOSPHINIC ACID HALIDES

Elmar Lohmar, Rodenkirchen; Klaus Gehrmann, Erftstadt-Lechenich; Alexander Ohorodnik, Erftstadt-Liblar, and Paul Stutzke, Walberberg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 29, 1976, Ser. No. 700,769

Claims priority, application Germany, July 3, 1975, 2529731

Int. Cl.² C07F *9/34*; C07D *53/22*

U.S. Cl. 260—543 P 2 Claims

1. Process for the production of a beta-halogenoformylethyl phosphinic acid halide of the general formula: $R^1XP(O)—CH-R^2—CHR^3—CO—X$, in which R^1 stands for an alkyl radical having 1, 2, 3 or 4 carbon atoms or a phenyl radical, R^2 and R^3 each stand for hydrogen or CH_3, and X stands for chlorine or bromine, by reacting an alkyldihalogenophosphine having 1, 2, 3 or 4 carbon atoms in its alkyl radical, or a phenyldihalogenophosphine, with acrylic acid, methacrylic acid or crotonic acid, which process comprises: introducing, into a reaction zone, a quantity of the desired beta-halogenoformyl-ethyl phosphinic acid halide; circulating the said phosphinic acid halide in the form of a melt at a temperature of 50° to 120° C and at a flow rate of 0.1 to 3 m/s, through a heat exchanger; admixing the circulated phosphinic acid halide with the respective starting materials, the latter being added in substantially equimolar proportions; allowing the resulting mixture to undergo reaction for a period of 5 to 120 minutes; and thereafter removing beta-halogenformyl-ethyl phosphinic acid halide.

4,022,827

HEPTACHLORO-ALPHA-NAPHTHOYL CHLORIDE

Grover L. Farrar, Greenville, S.C., and Phillip W. Storms, Littleton, Colo., assignors to Marathon Oil Company, Findlay, Ohio

Division of Ser. No. 35,244, May 6, 1970, Pat. No. 3,939,198, which is a continuation-in-part of Ser. No. 529,221, Feb. 23, 1966, abandoned. This application Aug. 27, 1975, Ser. No. 608,315

Int. Cl.² C07C *63/44*

U.S. Cl. 260—544 B 1 Claim

1. Heptachloro-alpha-naphthalene carbonyl chloride.

4,022,828

VULCANIZATION INHIBITING COMPOUNDS

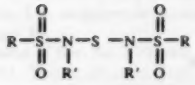
Robert J. Arnold, Evanston, and Marion J. Gattuso, Hoffman Estates, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Mar. 25, 1974, Ser. No. 454,628

Int. Cl.² C07C *143/74*, *143/77*, *143/78*, *143/00*

U.S. Cl. 260—545 R 3 Claims

1. A compound having the formula:



in which R and R′ are independently selected from the group consisting of alkyl of from 1 to about 6 carbon atoms, cycloalkyl having from 3 to about 8 carbon atoms in the ring, phenyl and tolyl radicals, and *x* is an integer of from 1 to 3.

4,022,829

THIOETHERS

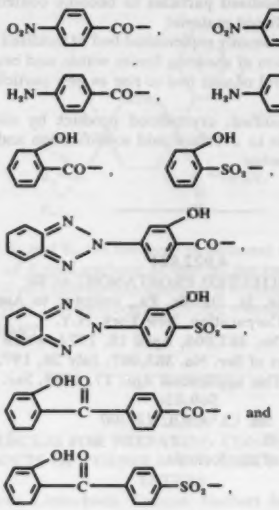
John Fred Gerecht, Somerville, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 148,158, May 28, 1971, Pat. No. 3,864,474, which is a continuation-in-part of Ser. No. 820,280, April 29, 1969, abandoned, which is a continuation-in-part of Ser. No. 492,316, Oct. 1, 1965, abandoned. This application Jan. 6, 1975, Ser. No. 538,687

Int. Cl.² C07C *103/38*

U.S. Cl. 260—558 S 4 Claims

1. A thioether represented by the formula A—N-H—R—S—R′ wherein A is a sunscreening moiety having a prominent spectral absorption peak within the range of 250–400 millimicrons and being selected from the group consisting of



R represents an alkylene of from 2 to 18 carbon atoms, and R′ represents an alkyl group containing from 7 to 26 carbon atoms.

4,022,830

PROCESS FOR PREPARING POLYCHLOROBENZAMIDE DERIVATIVES

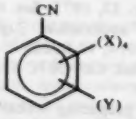
Lewis W. Watts, Jr., Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 379,545, July 16, 1973, abandoned. This application Aug. 15, 1975, Ser. No. 605,113

Int. Cl.² C07C *102/08*

U.S. Cl. 260—559 R 5 Claims

1. A process for preparing a polychlorobenzamide derivative with essentially no further hydrolysis to the acid in commercially economical yields from the corresponding polychlorobenzonitrile compound having the formula:



wherein X is selected from a group consisting of a chloro radical and Y is a hydroxy radical comprising the step of:

initially admixing and reacting said polychlorobenzonitrile compound with a molar excess of sulfuric acid of a con-

centration sufficient to hydrolyze said polychlorobenzonitrile compound at elevated temperatures of from about 100° to 170° C to form a reaction mixture containing said polychlorobenzamide derivative.

4,022,831

PREPARATION OF METHACRYLAMIDES

Roger W. Spoerke, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 484,051, June 28, 1974, Pat. No. 3,945,970. This application June 24, 1975, Ser. No. 589,973

Int. Cl.² C07C *103/44*

U.S. Cl. 260—562 R **13 Claims**

1. In a process for the synthesis of a methacrylamide comprising

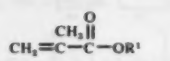
a. reacting a methacrylic ester with an amine in an organic solvent in the presence of a basic catalyst to yield an intermediate salt,

b. removing the salt from solution,

c. washing the salt with an organic solvent,

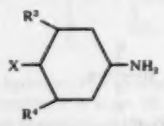
d. drying the salt, and

e. hydrolyzing the salt with dilute acid to form the methacrylamide, the improvement wherein the solvent is an organic solvent having a boiling point above 100° C. and wherein the methacrylic ester has the general structure (I)



(I)

the amine has the general structure (II)



(II)

and the basic catalyst is selected from the group consisting of amides and alkoxides and wherein R^1 is a radical selected from the group consisting of alkyl radicals having from 1 to 10 carbon atoms, aryl radicals having from 6 to 12 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms, X is selected from the group consisting of HO- and R^2-NH wherein R^2 is selected from the group consisting of hydrogen, alkyl radicals having from 1 to 20 carbon atoms, cycloalkyl radicals having from 5 to 12 carbon atoms, aryl radicals having from 6 to 12 carbon atoms, aralkyl radicals having from 7 to 13 carbon atoms and wherein R^3 and R^4 are the same or different radicals selected from the group consisting of hydrogen and tert. alkyl radicals having from 4 to 8 carbon atoms.

4,022,832

2-AMINOACETAMIDO-α-PHENYLBENZYLIDENEAMINOALKANOL DERIVATIVES AND PROCESS FOR THE PREPARATION THEREOF

Ryuji Tachikawa; Tetsuo Miyadera; Atsusuke Terada; Toshiharu Kamioka, and Syunji Naruto, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

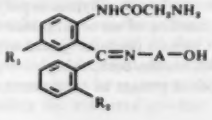
Filed Dec. 31, 1975, Ser. No. 645,890

Claims priority, application Japan, Jan. 20, 1975, 50-8503

Int. Cl.² C07C *103/50*

U.S. Cl. 260—562 N **6 Claims**

1. A compound having the formula



wherein R_1 represents hydrogen atom or a halogen atom, R_2 represents hydrogen atom or fluorine atom and A represents an alkylene group having 1–4 carbon atoms.

4,022,833

N,N′-BRIDGED-BIS[2-ALKYL-2-HYDROXYETHYLAMINES]

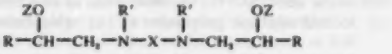
Guy D. Diana, Stephentown, and Royal A. Cutler, Sand Lake, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 332,267, Feb. 14, 1973, Pat. No. 3,928,427, which is a continuation-in-part of Ser. No. 123,097, March 10, 1971, abandoned. This application June 2, 1975, Ser. No. 582,646

Int. Cl.² C07C *91/14*; A61K *31/13*

U.S. Cl. 260—563 R **10 Claims**

1. N,N′-(X)-bis of the formula



wherein:

R is alkyl of three to fifteen carbon atoms or cycloalkyl of four to seven ring carbon atoms;

R′ is hydrogen or atertiary alkyl of one to four carbon atoms;

X is X′-Y-X″, wherein X′ and X″ are alkylene of one to four carbon atoms with bonds to Y and to the nitrogen atoms at the same or different carbon atoms and

Y is cycloslkylene of four to seven ring carbon atoms with bonds to X′ and X″ at the same or different carbon atoms;

the sum of the number of carbon atoms of R and X is at least nine;

Z is hydrogen; or

an acid-addition salt thereof; or

when R′ is atertiary alkyl of one to four carbon atoms, an N,N′-dioxide thereof.

4,022,834

ANTIBACTERIALLY ACTIVE HEXAMETHYLENE-BIS-BIGUANIDES

Helge Guttorm Gundersen, Oslo, Norway, assignor to A/S Farmaceutisk Industri, Oslo, Norway

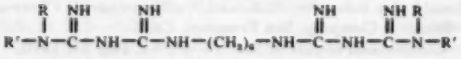
Continuation of Ser. No. 340,890, March 13, 1973, abandoned. This application May 1, 1975, Ser. No. 573,517

Claims priority, application Norway, Mar. 16, 1972, 72864

Int. Cl.² C07C *129/16*

U.S. Cl. 260—564 B **5 Claims**

1. A compound of the formula



wherein R represents H and R′ is selected from the group consisting of 1-adamantyl, 2-norbonyl and cyclohexylmethyl or wherein R and R′ together with the adjacent nitrogen atom form a 3-azabicyclo(3,2,2)-nonane double ring and pharmaceutically acceptable acid addition salts.

4,022,835

MULTIPLE METAL DEACTIVATORS, METHOD FOR PREPARING, AND USE THEREOF

Theodore C. Shields, Ashland, Ky., assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Mar. 10, 1975, Ser. No. 557,001
Int. Cl.² C07C *119/00*
U.S. Cl. 260—566 F 12 Claims

1. A metal deactivator composition produced by the process of:

a. partially reacting in a liquid solvent at a temperature below about 200° C., an aliphatic polyamine selected from the group consisting of ethylenediamine, 1,2-propanediamine, 1,2-diaminocyclohexane, 2,3-diaminobutane, 1,3-propanediamine, 1,3-butanediamine, 2,4-pentanediamine, 1,6-hexanediamine, diethylenetriamine and mixtures of these, with a beta-diketone selected from the group consisting of 2,4-pentanedione, 2,2,6,6-tetramethyl-3,5-heptanedione, 2,6-dimethyl-3,5-heptanedione, 3,5-heptanedione, 2,4-hexanedione, 5-methyl-2,4-hexanedione and 5,5-dimethyl-2,4-hexanedione; and

b. reacting the resulting reaction product in a liquid organic solvent completely with salicylaldehyde at a temperature below about 60° C., the mole ratio of said beta-diketone to said aliphatic polyamine of (a) being between about 0.6 to 1 and about 1.4 to 1, the mole ratio of said salicylaldehyde of (b) to said aliphatic polyamine of (a) being between about 1.4 to 1 and about 0.6 to 1, and the ratio of the total moles of said beta-diketone and said salicylaldehyde to the total moles of ethylenediamine being about 2 to 1.

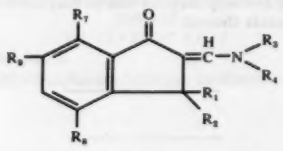
4,022,836

2-AMINOMETHYLENEINDANONE ANALGESIC AGENTS

Philip D. Hammen, East Lyme, and George M. Milne, Jr., Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Dec. 6, 1972, Ser. No. 312,693
Int. Cl.² C07C *87/28*
U.S. Cl. 260—570.8 R 13 Claims

1. A compound of the formula



and the pharmaceutically acceptable acid addition salts thereof,

wherein R_1, R_2, R_3 and R_4 are each selected from the group consisting of hydrogen, hydroxy lower alkyl and lower alkyl,

R_7 and R_8 are each selected from the group consisting of hydrogen, fluorine and chlorine,

and R_9 is chosen from the group consisting of hydrogen and fluorine.

4,022,837

PRODUCTION OF KETONES FROM ALKENES, HYDRATED MOLYBDENUM(VI) OXIDE AND WATER

Ronald Alan Schneider, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 49,561, July 24, 1970, abandoned. This application Mar. 31, 1975, Ser. No. 563,742
Int. Cl.² C07C *45/02*
U.S. Cl. 260—597 R 11 Claims

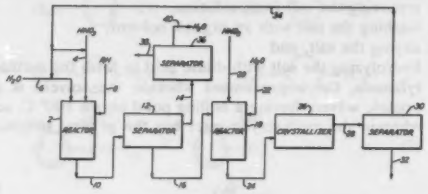
1. A process for the conversion of an alkene to a ketone which comprises contacting, at a temperature between about 200° and 400° C, a mixture consisting essentially of water and said alkene with a composition consisting essentially of hydrated molybdenum(VI) oxide wherein said alkene is a gas or liquid at said temperature and wherein the carbon-carbon double bond carbon atoms of said alkene are both secondary carbons or one is secondary and the other is primary carbon, and wherein said mixture has a mol ratio of water to alkene between about 1:1 and 100:1.

4,022,838

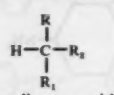
PROCESS FOR PREPARING DIARYLKETONES

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed May 27, 1975, Ser. No. 581,287
Int. Cl.² C07C *49/76*
U.S. Cl. 260—591 9 Claims



1. A process for converting a 1,1-diarylalkane selected from the group consisting of 1,1-di(para-tdyl) ethane and 1,1-bis(3,4-dimethylphenyl) ethane



to the corresponding diarylketone without appreciably converting the alkyl substituents on the aryl radicals which comprises heating a mixture of said 1,1-diarylalkane, nitric acid and water, the nitric acid having a concentration of about 1 to about 40 percent, the molar amount of nitric acid determined as 100 percent nitric acid, relative to the molar amount of said 1,1-diarylalkane being in the range of about 1.5:1 to about 6:1, wherein the numerical product obtained by multiplying the concentration of nitric acid in said mixture with the ratio of the absolute mols of nitric acid to the mols of said 1,1-diarylalkane in said mixture is in the range of about 1.0 to 150, at a temperature of about 60° to about 200° C. for about 5 minutes to about 24 hours, to obtain a reaction product containing an organic phase and an aqueous phase, separating said phases from each other, and then recovering said desired 1,1-diarylketone from said organic phase.

4,022,839

RECOVERY OF ALUMINUM FROM ETHYLENE TELOMER PRODUCT

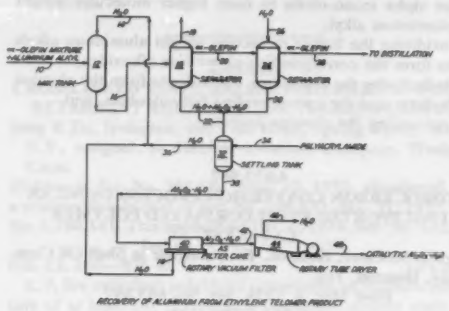
Harold Beuther, Gibsonia; William L. Kehl, Indiana Township, Allegheny County, and Harold E. Swift, Gibsonia, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 25, 1976, Ser. No. 699,899
Int. Cl.² C07C *11/02*
U.S. Cl. 260—677 A 8 Claims

1. A process for the removal of aluminum from the product stream of an alpha-olefin process wherein ethylene is polymerized to alpha-olefins in the presence of an organo-aluminum catalyst to produce a product stream containing said organo-aluminum catalyst in the alpha-olefins comprising:

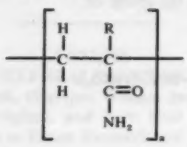
mixing water with said product stream in an amount sufficient to produce:

a. an aqueous phase containing a fine suspension of aluminum hydroxide particles, and
b. an alpha-olefin phase;
and thereafter adding a sufficient amount of an aqueous solu-



RECOVERY OF ALUMINUM FROM ETHYLENE TELOMER PRODUCT

tion of a polyacrylamide to said aqueous phase containing said suspension to result in at least 90 weight percent of the aluminum hydroxide in said suspension to settle from said suspension in less than ten minutes at ambient conditions, said polyacrylamide having the formula:



where R can be hydrogen or a hydrocarbon group having from 1 to 6 carbon atoms; n is from 80×10^3 to 15×10^5; and wherein a sufficient portion of the NH_2 groups are converted to an acid salt form to impart anionic properties to the polyacrylamide.

4,022,840

PROCESS AND CATALYST FOR THE PREPARATION OF LINEAR MONO-OLEFINES BY CATALYTIC DEHYDROGENATION OF LINEAR PARAFFINS

Lucio Forni, and Renzo Invernizzi, both of Milan, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed May 23, 1975, Ser. No. 580,233
Claims priority, application Italy, May 30, 1974, 23316/74
Int. Cl.² C07C *5/18*
U.S. Cl. 260—683.3 **8 Claims**

1. A process for the preparation of linear mono-olefines having from 6 to 16 carbon atoms per molecule by catalytic dehydrogenation of linear paraffins having from 6 to 16 carbon atoms per molecule, which comprises contacting in the presence of hydrogen gas, at elevated temperature and at a pressure equal to or above atmospheric, at least one of said paraffins with a porous dehydrogenation catalyst consisting essentially of beryllium oxide and of from 0.001 to 10% by weight of at least one noble metal, prepared by:
co-precipitating hydroxides of beryllium and of at least one noble metal from an aqueous solution of soluble compounds of the said elements, the relative proportions of said compounds in said solution being such as to ensure in the finished catalyst a content of noble metal of from 0.001 to 10% by weight;
drying said hydroxides progressively for a period of at least 10 hours up to a temperature not exceeding about 150° C;
activating the resulting dried product at a temperature of from 100° to 600° C, first in an inert atmosphere for a period of at least 30 minutes and then in a reducing atmosphere for a period of at least 3 hours;
cooling the activated product in an inert atmosphere.

4,022,841

ORGANOMETALLIC COMPLEXES AS ALKYLAROMATIC OXIDATION CATALYSTS

Howard P. Angstadt, Media, and William P. Griffin, Jr., Bethel Park, both of Pa., assignors to Sun Company, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 741,285, July 1, 1968, abandoned, which is a continuation-in-part of Ser. No. 695,312, Dec. 26, 1967, abandoned. This application Oct. 31, 1968, Ser. No. 772,421
Int. Cl.² C07C *179/02*, *179/04*
U.S. Cl. 260—610 B **16 Claims**

1. In the process for the catalytic oxidation of secondary or tertiary alkylaromatic hydrocarbons of the formula

wherein R is lower alkyl; R_1 is lower alkyl or hydrogen; and Ar is an aromatic nucleus selected from the group consisting of phenyl and naphthyl, in the presence of air or oxygen at a temperature of from about 80 to 150° C to form a reaction mixture comprising the corresponding hydroperoxides, the improvement wherein the catalyst is of the formula

$$MX_n(HAPA)_m$$

wherein HAPA is a hexaalkylphosphoramide, the alkyl moiety of which has from one to thirty carbon atoms; MX is metal salt wherein M is a transition metal cation of Group IB, IIB, IIIB, IVB, VB, VIB, VIIB, VIIIB or IIA of the Periodic Table and X is an inorganic anion of said metal salt; m is an integer of from 1 to 8; and n is an integer of from 1 to 4, wherein the ratio of said catalyst to said alkylaromatic hydrocarbon is from about 0.1 to 5.0 parts by weight of catalyst per 100 parts by weight of alkylaromatic hydrocarbon.

4,022,842

BIBENZYL COMPOUNDS

Tohru Hashimoto, Musashino; Akira Kawarada, and Sachiko Tamura, both of Tokyo, all of Japan, assignors to Rikagaku Kenkyusho, Japan

Division of Ser. No. 331,498, Feb. 12, 1973. This application May 6, 1975, Ser. No. 574,890
Claims priority, application Japan, Feb. 14, 1972, 47-15345; Dec. 26, 1972, 48-3299
Int. Cl.² C07C *43/22*
U.S. Cl. 260—613 A **3 Claims**

1. A compound in purified form selected from the group consisting of 2,2′-dihydroxy-3,5-dihydroxybibenzyl and 3,3′-dihydroxy-5-methoxybibenzyl.

4,022,843

LIQUID PHASE METHYLATION OF ORTHO CRESOL

Bruce E. Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

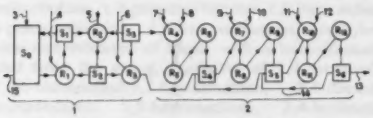
Filed Aug. 25, 1975, Ser. No. 607,733
The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.
Int. Cl.² C07C *39/06*
U.S. Cl. 260—621 R **8 Claims**

1. A process for the liquid phase methylation of ortho cresol to produce 2,6-xylenol and 2,3,6-trimethylphenol comprising:
a. contacting ortho cresol with methanol in liquid phase,
b. at a temperature of from about 300° to about 390° C,
c. at a pressure of from about 400 to about 600 psig, while
d. in contact with an alumina catalyst derived from aluminum alkoxide hydrolysis.

4,022,844
PROCESS FOR CONTINUOUS PRODUCTION OF TRINITROTOLUENE

Hubert E. de Cazenove, Paris; Daniel Doyen, Sorgues; Jacques M. Dussidour, and Jean-Jacques Gautier, both of Saint Chamas, all of France, assignors to Societe Nationale des Poudres et Explosifs, France

Filed Feb. 20, 1973, Ser. No. 334,007
Claims priority, application France, Feb. 25, 1972, 72.06415
Int. Cl.² C07C 79/10
U.S. Cl. 260—645 7 Claims



1. The process for the continuous production of trinitrotoluene by nitration of dinitrotoluene in the presence of concentrated nitric acid and concentrated sulphuric acid or fuming sulphuric acid, wherein the nitration step is carried out in at least two reaction stages, said sulfuric acid and said nitric acid flowing in co-currently therein, each stage having at least two nitration zones in series followed by a separation zone, the first of said nitration zones of each stage is supplied separately with said mixture of concentrated sulphuric acid or fuming sulphuric acid and nitric acid, the total amount of said concentrated sulphuric acid or fuming sulphuric acid and nitric acid is distributed in said at least two reaction stages and trinitrotoluene is separated from said acids in each separation zone, the amount of nitric acid and sulphuric acid being so controlled that when the reaction mixture reaches each separation zone it is depleted to such an extent in nitric acid that essentially no nitration reaction occurs in each separation zone.

4,022,845
PROCESS FOR PRODUCING ALKYL ADAMANTANES

Kosaku Honna, Chiba; Nobuaki Shimizu, Fukuoka, and Konomu Kurisaki, Chiba, all of Japan, assignors to Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.), Tokyo, Japan

Filed May 28, 1976, Ser. No. 690,862
Int. Cl.² C07C 5/24
U.S. Cl. 260—666 M 8 Claims

1. A process for producing alkyl adamantanes which comprises reacting tetracyclo-(6.2.1.1^{3,6}.0^{2,7}) dodecanes and hydrogen in the presence of H-Y type zeolite or zeolite subjected to ion-exchange with at least one kind of metal ion selected from the group consisting of alkaline earth metals and rare earth metals as a catalyst.

4,022,846
PROCESS FOR PRODUCING OLEFINS BY DISPROPORTIONATION

John Kenneth Allen, Sale; Brian Michael Palmer, London, and Brian Patrick McGrath, Beverley, all of England, assignors to BP Chemicals International Limited, London, England

Division of Ser. No. 264,447, June 20, 1972, Pat. No. 3,903,021. This application May 21, 1975, Ser. No. 579,437
Claims priority, application United Kingdom, June 25, 1971, 29872/71
Int. Cl.² C07C 3/62
U.S. Cl. 260—683 D 14 Claims

1. A process for the production of olefins which process consists of contacting an olefinic hydrocarbon feedstock capable of undergoing a disproportionation process with an activated disproportionation catalyst at a temperature of between −20° C and +500° C and a pressure of between 0 and 2,000 psig, said disproportionation catalyst comprising rhenium heptoxide supported on gamma-alumina obtained by calcination of an alumina hydrate, which alumina hydrate is prepared by a process which consists of the following steps:

a. reacting an aluminum alkyl of low molecular weight with an alpha mono-olefin to form higher molecular weight aluminium alkyl,
b. oxidizing the higher molecular weight aluminium alkyls to form the corresponding aluminium alkoxides,
c. hydrolyzing the aluminium alkoxides to form the alumina hydrate and the corresponding fatty-alcohols, and
d. recovering the alumina hydrate.

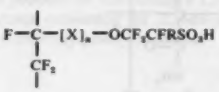
4,022,847
HYDROCARBON CONVERSION PROCESS USING AN UNSUPPORTED PERFLUORINATED POLYMER CATALYST

James D. McClure, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 4, 1976, Ser. No. 663,897
Int. Cl.² C07C 5/24
U.S. Cl. 260—683.68 7 Claims

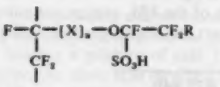
1. An isomerization process which comprises contacting a C_4 to C_8 normal paraffin feedstock at a reaction temperature of between about 125° and about 225° C in the presence of a catalyst comprising an unsupported solid, perfluorinated polymer catalyst wherein said catalyst contains a repeating structure selected from the group of:

a)



or

b)



where n is 0, 1 or 2; R is a radical selected from the group consisting of fluorine and perfluoroalkyl radicals having from 1 to 10 carbon atoms; and X is selected from the group consisting of:

$[O(CF_2)_m]$, $[OCF_2CFY]$ or $[OCFYCF_2]$

where m is an integer from 2 to 10 and Y is a radical selected from the class consisting of fluorine and the trifluoromethyl radical.

4,022,848
BLADDER COMPOSITION CONTAINING LOW UNSATURATION BUTYL RUBBER

Lewis T. Lukich, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 5, 1974, Ser. No. 494,655
Int. Cl.² C08L 9/00, 61/14
U.S. Cl. 260—846 4 Claims

1. A product selected from the group consisting of tire curing bladders, air bags and curing tubes, said product being prepared from an essentially zinc oxide-free polymeric composition comprising

A. 100 parts by weight of low unsaturation butyl rubber containing 0.5 to 1.1 mole percent of isoprene and correspondingly 98.9 to 99.5 mole percent of isobutylene,
B. 1.0 to 10.0 parts by weight of bromomethyl alkylated phenolic resin prepared by brominating a resitol of a 2,6-dihydroxymethyl 4-alkyl phenol, wherein the said

alkyl group containing 4 to 20 carbon atoms and the average bromine content of the brominated resitol being from about 1 to about 9 percent, and

C. 0.25 to 2.0 parts by weight of a metal halide selected from the group consisting of zinc halides and stannous halides.

4,022,849

CROSSLINKED VINYL HALIDE POLYMERS AS FLAME RETARDANT ADDITIVES FOR THERMOPLASTICS

Jung Il Jin, Irvington, and Paul Kraft, Spring Valley, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 395,684, Sept. 10, 1973, abandoned, and a continuation-in-part of Ser. No. 108,632, Jan. 21, 1971, Pat. No. 3,780,141. This application Oct. 7, 1974, Ser. No. 512,773

Int. Cl.² C08L *55/02, 9/02*

U.S. Cl. 260—876 R **13 Claims**

1. A fire retardant polyblend comprising an intimate admixture of at least one acrylonitrile-butadiene-styrene resin and an effective flame retarding concentration of at least one crosslinked copolymer of: (1) at least one vinyl halide selected from the group consisting of vinyl chloride, vinyl bromide and vinyl fluoride present in a concentration of from 50–99% by weight and (2) at least one polyfunctional ethylenically unsaturated monomer, present in a concentration of from about 1–50% by weight.

4,022,850

SELF-SEALING FILMS

David Andrew Booth, Overijse; William James Busby, Tervueren, both of Belgium, and Jean Paul Loree, Nohanent, France, assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 424,772, Dec. 14, 1973, abandoned. This application June 13, 1975, Ser. No. 586,641

Int. Cl.² C08L *23/08*

U.S. Cl. 260—897 B **12 Claims**

1. A transparent self-sealing tubular blown, elastic film made from a composition comprising (i) 90 to 99.95 wt. % of a copolymer of ethylene and a vinyl (or hydrocarbyl substituted vinyl) ester of a C_1–C_{30} monocarboxylic acid containing at least 89 wt. % of ethylene and at least 5 wt. % of said vinyl ester wherein said copolymer has a melt index of about 0.2 to about 20 and (ii) either 0.05 to 10 wt. % of a hydrocarbon resin selected from the group consisting of polyterpenes, coumarone-indene resins, and polymers from petroleum distillate fractions, or 0.05 to 5 wt. % of liquid polyisobutylene or liquid polybutylene or a combination of 0.05 to 10 wt. % of the hydrocarbon resin and 0.05 to 5 wt. % of the polyisobutylene or polybutylene, provided the combined weight of hydrocarbon resin and polyisobutylene or polybutylene is not more than 10 wt. %.

4,022,851

1-HYDROXY-2-BROMO-3-ALLYLOXY-PROPANE PHOSPHORIC ACID ESTER

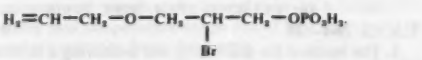
Seymour M. Linder, Baltimore, Md., assignor to Alcolac Inc., Baltimore, Md.

Filed July 28, 1976, Ser. No. 709,253

Int. Cl.² C07F *9/32;* **C08F** *130/2*

U.S. Cl. 260—950 **1 Claim**

1. A polymerizable flame-retardant monomer consisting essentially of 1-hydroxy-2-bromo-3-allyloxypropane phosphoric acid ester of the formula:



4,022,852

PROCESS FOR MAKING PHOSPHORUS SULFAMIDES

Hartfrid Vollmer, Erftstadt Liblar, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

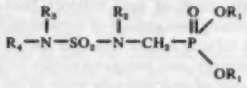
Filed July 1, 1975, Ser. No. 592,255

Claims priority, application Germany, July 5, 1974, 2432271

Int. Cl.² C07F *9/40*

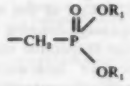
U.S. Cl. 260—970 **10 Claims**

1. A process for making phosphorus-containing sulfamide derivatives of the general formula (I)

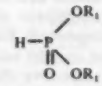


(I)

in which R_1 stands for an alkyl radical or a halogenated alkyl radical having from 1 to 6 carbon atoms or an aryl radical, and R_2, R_3 and R_4, being identical or different, each stand for a hydrogen atom, a hydroxyalkyl group or a radical of the formula:



which process comprises reacting a sulfamide with formaldehyde and a dialkyl or diarylphosphite of general formula (II)



(II)

in which R_1 stands for an alkyl radical or a halogenated alkyl radical having from 1 to 6 carbon atoms, or stands for an aryl radical, in stoichiometric proportions, in the presence of a basic catalyst and, if desired, in the further presence of a solvent or diluent, at temperatures within the range about 10° and 80° C, at a pH-value within the range about 7 and 12 and for a period within the range 1 and 3 hours, and distilling the resulting reaction mixture so as to remove reaction water and solvent or diluent, if any, therefrom.

4,022,853

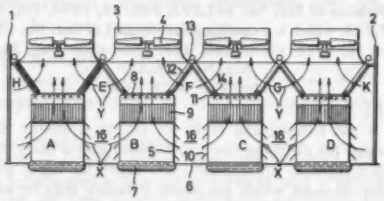
INSTALLATION FOR CHANGING THE TEMPERATURE OF FLUID MEDIA, PARTICULARLY FOR COOLING LIQUIDS AND CONDENSING VAPORS WITH AIR

Franz J. Schulenberg, Bochum, Germany, assignor to Gea Luftkuhlergesellschaft Happel GmbH & Co. KG, Bochum, Germany

Filed Oct. 30, 1974, Ser. No. 519,104

Int. Cl.² B01F *3/04;* **F28B** *1/06*

U.S. Cl. 261—23 R **10 Claims**



1. An installation for the cooling of liquid medium and the condensation of a vaporous medium by air, comprising a

plurality of air-liquid contacting arrangements for cooling said liquid medium and each including a chamber having an upper open end and first and second pairs of opposite side walls, spraying means adjacent the respective upper open end for spraying said liquid medium in downward direction into the respective chamber, and air inlet means in the first pair of opposite side walls below the respective spraying means, said air-liquid arrangements being arranged in a row with the first pair of opposite side walls thereof arranged substantially parallel to and spaced from each other; a plurality of heat-exchanger arrangements for cooling said vaporous medium respectively provided above said plurality of air-liquid contacting arrangements, each of said indirect heat-exchanger arrangements comprising two groups of substantially parallel, transversely spaced tubular heat-exchanger elements respectively projecting upwardly, and being outwardly inclined, from upper edges of first pair of opposite side walls of the respective chamber, means for feeding the vaporous medium to be condensed into upper ends of the respective tubular heat-exchanger elements, and means for discharging the condensate from the lower ends of the respective tubular heat-exchanger elements, the respective groups of upwardly and outwardly projecting tubular heat-exchanger elements located between two corresponding heat-exchanger arrangements being connected to each other at the upper ends to form a substantially V-shaped passage forming with said first pair of opposite side walls of the respective chambers an air inflow passage for the respective heat-exchanger arrangement whereas walls 1, 2 extending downwardly from the upper ends of the two outermost groups of tubular heat-exchanger elements form with corresponding side walls of the outermost air-liquid contacting arrangements the air inflow passages for the outermost groups of said tubular heat-exchanger elements; and a suction-generating arrangement above each of said indirect heat-exchanger arrangements for drawing first air streams through the respective air inlet means in the first pair of opposite side walls of the respective chambers in counter-current direction to the sprayed liquid in the respective chambers so that such air streams pass moisture-laden through the upper open ends of the respective chambers into the spaces between the respective groups of tubular heat-exchanger elements, said suction-generating arrangements also being effective for drawing second air streams through the respective air inflow passages and between the respective spaced tubular heat-exchanger elements into the respective spaces between the respective groups of tubular heat-exchanger elements so that said second air streams will be heated by heat exchange with the vaporous medium passing through the respective tubular heat-exchanger elements and intermixed in the respective spaces between the respective groups of tubular heat-exchanger elements with the moisture-laden air streams to be discharged in upward direction into the atmosphere, whereby cloud formation in the discharged intermixed air streams will be prevented.

4,022,854

GAS TRANSMITTING BODY FOR USE IN BUBBLE SHEARING

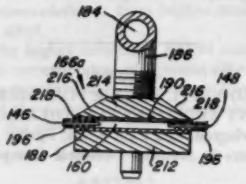
Gilbert M. Kyrias, Littleton, Colo., assignor to FMC Corporation, Chicago, Ill.

Division of Ser. No. 441,573, Feb. 11, 1974, Pat. No. 3,927,152, which is a continuation-in-part of Ser. No. 123,693, March 12, 1971, abandoned. This application Aug. 21, 1975, Ser. No. 606,417

Int. Cl.² B01F *3/04*

U.S. Cl. 261—122 **12 Claims**

1. A gas transmitting body for use in a bubble shearing apparatus for diffusing fine gas bubbles into a body of liquid which comprises an enclosed container having a gas inlet opening through which gas under pressure may be admitted into the space enclosed by said container, said container further having at least one wall with a plurality of gas transmitting passages extending therethrough, each of said passages providing a straight, unimpeded path for gas flow through said gas transmitting body and terminating in a capillary opening at the exterior of said container wall, to form a gas diffusing surface, substantially all said capillary openings having a diameter of no more than about 50 microns, said one wall having an edge defining one boundary thereof and the most remote of said capillary openings being no more than about 1.0 inch from said boundary edge.



4,022,855

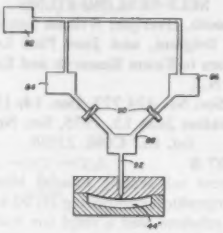
METHOD FOR MAKING A PLASTIC OPTICAL ELEMENT HAVING A GRADIENT INDEX OF REFRACTION

David P. Hamblen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,741

Int. Cl.² B29C *5/04;* **B29D** *11/00*

U.S. Cl. 264—1 **14 Claims**



1. A method of fabricating a plastic optical element having a gradient index of refraction, said method comprising:

a. providing first and second copolymerizable monomer compositions each having a different index of refraction;

b. introducing said compositions concurrently into an element cavity of a mold over a period of time and at respective introduction rates such that the proportion of said first composition introduction to said second composition introduction is less at the end of said period than at the beginning of said period;

c. rotating said mold on a central axis of its cavity at a speed sufficient to obtain centrifugal distribution of said compositions during at least a portion of said period so that the index of refraction of the composite mixture is said cavity varies gradiently, radially outwardly from the central axis; and

d. polymerizing said mixture to produce a shaped optical element having a gradient index of refraction.

4,022,856

ANCHORABLE URETHANE FOAMS

Edwin Morgan Maxey, Kent, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Jan. 6, 1975, Ser. No. 538,596

Int. Cl.² B29D *27/04;* **B29C** *27/04*

U.S. Cl. 264—26 **9 Claims**

1. The method for deforming and anchoring a flexible polyurethane foam containing dispersed therein at least 50 parts

by weight per 100 parts by weight of polyol in the formulation of said polyurethane of at least one solid thermoplastic resin composition fusible at a temperature below the fusion point of said polyurethane and composed of particles greater than 18 mesh (U.S. Sieve Series) and no larger than 2½ mesh (U.S. Sieve Series), any of said solid termoplastic resin compositions outside this particle size range being present in a total amount no greater than 50 percent by weight based on the weight of said solid thermoplastic resin composition within said particle size range, the total of all of said solid thermoplastic resin compositions being no greater than 100 parts by weight per 100 parts by weight of said polyol, said method comprising:

1. deforming said foam by compression thereof;
2. subjecting said foam while under said compression to sufficient heat to fuse at least some of said thermoplastic resin composition within said particle range without significantly fusing or otherwise decomposing said foam;
3. causing said fused thermoplastic resin composition to solidify while said foam is under said compression; and
4. releasing said foam from said compression whereby said foam remains substantially as deformed as when under compression.

4. The method of claim 1 wherein said heat in step (2) is supplied by dielectric heating.

4,022,857

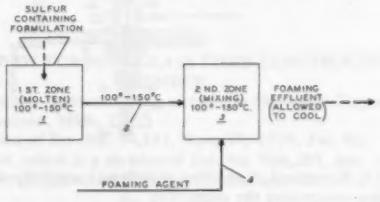
PRODUCTION OF FOAMED SULFUR COMPOSITIONS

John M. Dale, and Allen C. Ludwig, both of San Antonio, Tex., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 382,598, July 25, 1973, abandoned, which is a continuation-in-part of Ser. No. 281,587, Aug. 17, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,012

Int. Cl.² C04B *33/04;* **P29H** *7/20*

U.S. Cl. 264—42 **13 Claims**



1. A process for continuous production and application of sulfur-based foams which comprises the steps of:

a. heating at a temperature of 100° C to 150° C in a vessel a sulfur formulation containing at least 50% by weight sulfur and a minor amount of a gas-producing component, said formulation being heated until it is in liquid state;

b. passing said liquid state formulation at a temperature within said temperature range out of said vessel and into a mixer separate from the vessel;

c. mixing said formulation in said mixer with a foaming agent which in combination with said gas-producing component releases gas to produce a gas-containing mixture;

d. passing said gas-containing mixture from said mixer, at a rate such that the average residence time of the liquid state formulation in said mixer is between 0.1 and 3.0 seconds, to produce a cellular construction material.

4,022,858

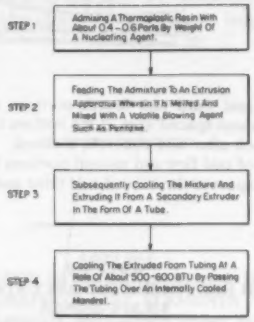
METHOD FOR THE PRODUCTION OF FOAMED THERMOPLASTIC FILM HAVING IMPROVED RESILIENCY AND FLEXIBILITY CHARACTERISTICS

Anthony John Cavanna, Pittsford, and Edward Armando Colombo, Fairport, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 320,428, Jan. 2, 1973, abandoned. This application Dec. 26, 1974, Ser. No. 536,495

Int. Cl.² B29D *7/22, 27/00*

U.S. Cl. 264—51 **5 Claims**


STEP 1
Admixing A Thermoplastic Resin With About 0.4 - 0.6 Parts By Weight Of A Nucleating Agent.
STEP 2
Feeding The Admixture To An Extrusion Apparatus Wherein It Is Melted And Mixed With A Volatile Blowing Agent Such As Pentane.
STEP 3
Subsequently Cooling The Mixture And Extruding It From A Secondary Extruder In The Form Of A Tube.
STEP 4
Cooling The Extruded Foam Tubing At A Rate Of About 500-600 BTU By Passing The Tubing Over An Internally Cooled Mandrel.

1. In a process for the production of thermoplastic foamed film or sheeting by plastifying a thermoplastic resin, blending such with a nucleating agent and a foaming agent, extruding such blend in the form of tubular film of sheeting while simultaneously foaming said film or sheeting, and cooling said foamed tubular film or sheeting to an extent sufficient to stabilize said foamed tubular film or sheeting; the improvement, whereby increasing the flexural characteristic of said foamed tubular film or sheeting, and products made therefrom which comprises utilizing about 0.4 to 0.6 parts by weight of said nucleating agent per 100 parts of said resin, and cooling said foamed tubular film or sheeting at a rate of about 500 to 600 BTU per minute, whereby providing about 25 to 55 void cells per $4in^2$ of said foamed tubular film or sheeting, when viewed in two dimensions at 100 times magnification.

4,022,859

METHOD OF PRODUCING SHAPED CONCRETE BLOCKS FOR HYDRAULICS

Mauro Fioretto, Trana (Turin), Italy, assignor to Montan - Castell A.G., Burgdorf, Switzerland

Filed Dec. 12, 1974, Ser. No. 532,003

Claims priority, application Switzerland, Dec. 14, 1973, 17515/73

Int. Cl.² B28B *1/08*

U.S. Cl. 264—69 **6 Claims**

1. A method of producing a shaped concrete block having two spaced arms formed at right angles to each other and a web at right angles to both of the arms and connecting the centers thereof, comprising:

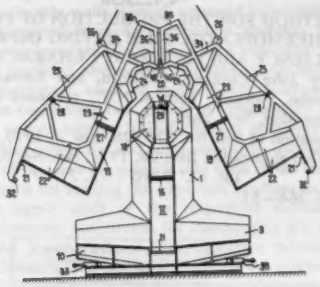
providing a mold having first, second, third and fourth portions and a base for concreting said concrete block with the arms located horizontally one above the other and the web vertically;

filling said mold with concrete;

pivoting and first and second mold portions away from each

other about a horizontal axis at the top thereof to expose lateral and upper surfaces of said block after said concrete has set whereby said first and second mold portions thereby may be reused;

supporting the upper arm by said third and fourth portions while said block rests on said base as the concrete cures; and



pivoting said third and fourth portions away from each other about spaced axes at the bottom thereof to release the block after said concrete is cured;

said axis of said first and second portions being orthogonal with respect to the axes of said third and fourth portions.

4,022,860

METHOD FOR PRODUCING ARCUATELY CURVED FILM CASINGS

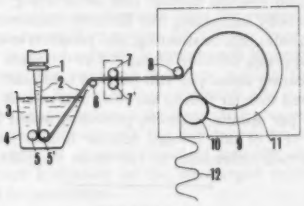
Katsuhiko Sugeno, and Toshimi Yamami, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 13, 1975, Ser. No. 540,602

Claims priority, application Japan, Jan. 19, 1974, 49-8704

Int. Cl.² A22C *13/00*; B29C *17/07*

U.S. Cl. 264—95 **5 Claims**



1. A method for producing an arcuately curved tubular film casing comprising the steps of:

extruding a vinylidene chloride-based copolymer resin to form a non-crystalline, non-stretched resin tube;

cooling the extruded resin tube immediately;

advancing the resin tube along and in contact with a cylindrical shaping surface;

longitudinally stretching said resin tube continuously while in contact with said shaping surface;

inflating said resin tube continuously while advancing said tube in an arcuate path along and in contact with said cylindrical shaping surface, to produce circumferential stretching, said circumferential stretching occurring to a greater degree at the outer periphery than at the inner periphery to produce an arcuately curved form without application of heat; and

removing said resin tube from said shaping surface under a tension less than that required to stretch the film.

4,022,861

METHODS OF MANUFACTURING WATER-REPELLENT FLUFFY BATTS OF WOOD PULP FIBERS

Yvon George Levesque, Montreal, Canada, assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation-in-part of Ser. No. 431,193, Jan. 7, 1974, abandoned. This application June 10, 1975, Ser. No. 585,438

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² D04H *3/16*

U.S. Cl. 264—116 **3 Claims**

1. A method of manufacturing a water-repellent, fluffy, lightweight batt of wood pulp fibers comprising: providing a prepared hard, substantially dry board of compacted wood pulp fibers, applying to a surface of said board while in a non-aqueous condition between ¼ and 2% by weight of said board of a water-repellent material, said water-repellent coating the fibers of the surface and extending through between 45 and 95% of the depth of the pulp board, grinding the treated pulp board to individualize and uniformly disperse water-repellent treated fibers and untreated fibers, and collecting the individualized fibers in the form of a lofty, fluffy batt of wood pulp fibers having water repellent material uniformly distributed throughout the batt whereby the entire batt is water repellent.

4,022,862

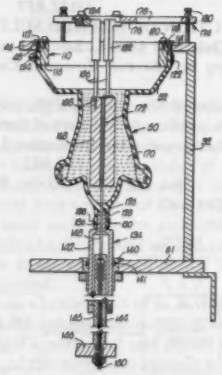
METHOD OF MOLDING AN ARTICLE IN AN EXPANSIBLE MOLD AND REMOVING THE ARTICLE FROM THE MOLD

Donald W. McBride, Independence, Mo.; Richard L. Glenn, Overland Park, Kans., and Barry A. Cooper, Wayzata, Minn., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.

Continuation-in-part of Ser. No. 551,756, Feb. 21, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 675,980

Int. Cl.² B29C *7/00*; B29D *3/00*

U.S. Cl. 264—271 **14 Claims**



1. A method of molding seamless, irregularly-shaped articles, comprising the steps of:

providing a distensible mold member having a cavity therein conforming to the shape of the article to be molded;

positioning that portion of said mold member which requires distension for removal of a molded article therefrom within a sealed housing defining a chamber for said mold member portion;

introducing flowable molding material into said cavity;

filling said chamber with liquid for supporting said mold member against distension under the weight of said molding material received within said cavity and for accelerating the cooling and solidification of said molding material therewithin;

permitting said molding material to solidify to form a molded article within said cavity;

removing a sufficient amount of fluid from said chamber under conditions to effect differential pressure distension of the mold member to an extent to permit removal of the molded article therefrom and without creating significant, fluid-free voids within said chamber; and

removing said molded article from said distended mold member.

4,022,863

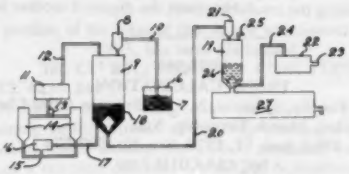
POLYMER PLASTIC STRAPPING FROM POLYETHYLENE TEREPHTHALATE

Thomas J. Karass, Mount Royal; Anh D. Nguyen, Longueil, and Paul Vegvari, St. Eustache, all of Canada, assignors to Caristrap Corporation, Chomedey, Canada

Filed June 4, 1975, Ser. No. 583,630

Int. Cl.² B29D 7/24

U.S. Cl. 264—210 R **2 Claims**



1. A process to produce high tensile polyester extruded strap using as a starting material a polyester resin obtained from the polymerization of terephthalic acid and ethylene glycol, said process comprising the steps of drying said polyester resin while in granular form to a final moisture content of about 0.2% by circulating hot dried air at about 300° F. through the granular polyester resin, keeping the dried polyester resin in a heated hopper to prevent moisture reabsorption by the polyester resin, said polyester resin being kept dried in the hopper by circulating hot air through the polyester resin at about 300° F., extruding the polyester resin in a nondegrading temperature range of between 482° F to 572° F., quenching the extrudate by cooling the same to about 122° F. and stretching the extrudate in two consecutive steps at a temperature of about 212° F., the draw ratio in the first stretching step being about 4 to 1 and the stretching ratio in the second stretching step varying between 2 to 1 and 2.5 to 1 to obtain a total stretching ratio varying between 8 to 1 and 9 to 1, the resulting polyester strap having a tensile strength of at least 75000 p.s.i. and an elongation at break of 8%.

4,022,864

METHOD OF FORMING GLASS FIBER CONSTRUCTION MEMBER

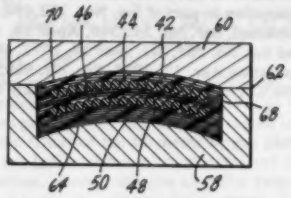
Albert Medler, Jackson, Mich., assignor to Plastigage Corporation, Jackson, Mich.

Division of Ser. No. 74,151, Sept. 21, 1970, Pat. No. 3,709,754, which is a division of Ser. No. 700,287, Jan. 24, 1968, Pat. No. 3,574,104. This application Sept. 22, 1972, Ser. No. 291,219

Int. Cl.² B29D 3/02, 9/00

U.S. Cl. 264—257 **2 Claims**

1. The method of forming an elongated construction member of glass fiber material employing a mold having an elongated recess, comprising the steps of placing superimposed layers of glass fiber fabric impregnated with a hardenable binder resin within the mold recess to form a first thickness of glass fiber fabric, placing a plurality of elongated, high density glass rods consisting of a plurality of longitudinally disposed glass fibers bonded together with a hardened binder resin while under tension in said recess substantially parallel to the length of the recess forming a first layer of glass rods, placing a plurality of superimposed layers of glass fiber fabric impregnated with a hardenable resin upon said rods to form a second thickness of glass fiber fabric, the amount of binder resin impregnating said first and second thickness of glass fiber



fabric being in excess of that necessary to impregnate only the associated fiber, the resin of said thicknesses of fabric entering the interstices between said rods, and hardening said hardenable resin to form an integral, homogeneous, bonded member.

4,022,865

PROCESS FOR WORKING UP BLOCK SHAPED GRAPHITE FUEL ELEMENTS

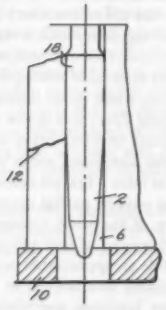
Karl-Gerhard Hackstein, and Gerhard Spener, both of Hanau, Germany, assignors to Hobeg Hochtemperaturreaktor-Brennelement GmbH, Hanau, Germany

Filed May 13, 1975, Ser. No. 577,104

Claims priority, application Germany, May 15, 1974, 2423611

Int. Cl.² C01G 113/00; G21C 19/36, 19/44

U.S. Cl. 423—4 **9 Claims**



1. In a process for recovering block shaped graphite fuel elements made of a graphite block with parallel cooling channels, said block containing the fuel arranged in separate zones, wherein the fuel elements are first comminuted mechanically and then are reconditioned by burning the carbon and wet chemical separation into fissile material and waste material the improvement comprising carrying out the mechanical comminution of the graphite block by simultaneously pressing conical pins into several cooling channels and continuing penetrating into the cooling channels until the block is broken apart along the entire length of the penetrated cooling channels.

4,022,866

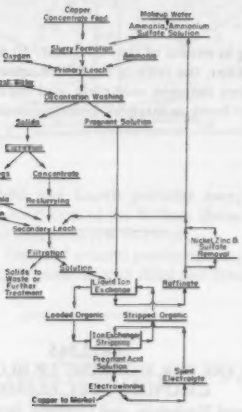
RECOVERY OF METALS

Martin C. Kuhn, and Nathaniel Arbiter, both of Tucson, Ariz., assignors to The Anaconda Company, New York, N.Y.

Continuation of Ser. No. 301,475, Oct. 27, 1972, abandoned, which is a continuation-in-part of Ser. Nos. 232,454, March 7, 1972, abandoned, Ser. No. 242,340, April 10, 1972, abandoned, and Ser. No. 265,709, June 28, 1972, abandoned. This application Apr. 17, 1975, Ser. No. 568,996

Int. Cl.² B03D *1/00;* **C01G** *3/00, 5/00;* **C22B** *11/00*

U.S. Cl. 423—26 **12 Claims**



1. The process for recovering a metal value of the group consisting of copper, zinc and nickel from a finely ground primary flotation concentrate containing one such metal value in the form of a sulfide mineral associated with iron sulfide, comprising slurrying said concentrate in an aqueous solution containing ammonium sulfate and free ammonia so proportioned as to maintain the pH of the slurry from about 9 to 11 and agitating the resulting slurry with a vigor input of at least 0.05 horsepower per cubic foot at a temperature in the range from 50° to 80° C. and at or near atmospheric pressure in the presence of free oxygen while recirculating said oxygen from above the surface of said slurry to a depth below such surface, the amount of ammonia utilized being correlated with the temperature so that the combined water vapor and ammonia partial pressures are at least a few psi below the total pressure of the system and the oxygen partial pressure makes up substantially the balance of the total pressure, terminating the leaching operation after most of said one such metal value has been dissolved but while an appreciable proportion of said one such metal value remains undissolved in the residual solids, withdrawing from the leaching operation slurry containing said one such metal value in dissolved form complexed with ammonia in the aqueous phase and mineral matter containing the undissolved portion of said one such metal value in the solid phase, separating the aqueous leach solution from the residual solids, and subjecting said residual solids to a secondary flotation concentration operation to produce a secondary sulfide concentrate substantially smaller in amount than the primary concentrate and containing said one such metal value which has passed through the leaching operation undissolved and to reject in the tailings of said secondary flotation operation iron sulfide of the primary concentrate which has been substantially freed by the leaching operation from said one such metal value.

4,022,867

SOLUBLE SILICATE REDUCTION IN SODIUM CARBONATE CRYSTALLIZER MOTHER LIQUORS

Alan B. Gancy, and Rustom P. Poncha, both of Syracuse, N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed June 17, 1975, Ser. No. 587,575

Int. Cl.² C01D *7/00*

U.S. Cl. 423—184 **18 Claims**

1. The method for treating soluble silicate-containing aqueous carbonate process crystallizer mother liquor from the process for making sodium carbonate precursor crystals by evaporative crystallization which comprises:

a. digesting said mother liquor at elevated temperature, for time sufficient to reduce soluble silicates, in the presence as treating agent of insolubles which have been obtained by calcination of crushed trona, segregation of a fine particle size fraction from the calcined trona, dissolution of said fine particle size fraction in an aqueous medium to obtain a solution comprising sodium carbonate and insolubles, followed by separating insolubles, and

b. separating the insolubles from the digested mother liquor.

4,022,868

TRONA CALCINATION

Rustom P. Poncha, Syracuse, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed June 17, 1975, Ser. No. 587,576

Int. Cl.² C01D *7/00*

U.S. Cl. 423—184 **7 Claims**

1. In the process of making sodium carbonate from trona involving the steps of crushing the trona, calcining the crushed trona, dissolving the calcined trona to obtain a solution comprising sodium carbonate and insoluble impurities, contaminated by soluble silicates, contamination of the sodium carbonate solution with soluble silicates and soluble carbonaceous matter is reduced by the improvement which comprises calcining the crushed trona at temperature of 300° C. to 600° C. in the presence as additive of magnesium oxide in amount of from about 0.5 to about 5 percent by weight, based on the weight of the trona.

4,022,869

METHOD FOR REMOVING HYDROGEN CHLORIDE FROM EXHAUST GAS CONTAINING SAME

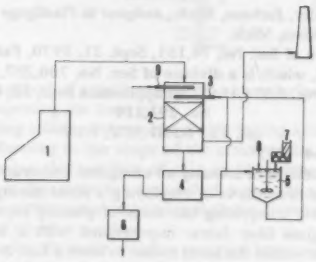
Shigeru Saitoh; Tetsuya Watanabe, and Katsutoshi Komahashi, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1975, Ser. No. 628,659

Claims priority, application Japan, Nov. 15, 1974, 49-131149; Apr. 14, 1975, 50-44247

Int. Cl.² B01D *53/34*

U.S. Cl. 423—240 **3 Claims**



1. A method for removing hydrogen chloride from an exhaust gas comprising:

circulating a slurry containing calcium carbonate or calcium hydroxide in a path through a contact zone wherein

said slurry is brought into contact with the exhaust gas to absorb hydrogen chloride in the form of calcium chloride, thereby producing a slurry having a temperature of at least 50° C and containing 50 to 60% by weight calcium chloride;

diverting a portion of said slurry from said circulation path; and

cooling said slurry portion to 40° C or below to solidify the entire slurry portion in the form of solid calcium chloride hydrate.

4,022,870

CATALYTIC PROCESS FOR REMOVING SULFUR DIOXIDE FROM GAS STREAMS

Frank C. Palilla, Framingham; Gary G. Gaudet, and Helmut Lingertat, both of Dorchester, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 524,855, Nov. 18, 1974, Pat. No. 3,931,390. This application July 16, 1975, Ser. No. 596,340

The portion of the term of this patent subsequent to Jan. 6, 1993, has been disclaimed.

Int. Cl.² B01J *8/00;* **C01B** *17/00, 17/02*

U.S. Cl. 423—244 **9 Claims**

1. A process for removing sulfur dioxide from a gas stream containing sulfur dioxide comprising passing a gas stream containing sulfur dioxide and carbon monoxide or hydrogen through a reaction chamber containing derivatives of Ln_2O_3. Co_2O_3 after prereduction by carbon monoxide or hydrogen, or derivatives of Ln_2O_3 . Co_2O_3 after prereduction by carbon monoxide or hydrogen and exposure to said gas stream, where Ln is either Y or Gd, to catalytically produce at a sufficiently elevated temperature a product stream containing elemental sulfur and carbon dioxide or water, and thereafter removing said elemental sulfur from said product stream.

4,022,871

PROCESS FOR THE FABRICATION OF SODIUM BICARBONATE AND BORIC ACID FROM BOROSODIUM ORES

Paul Demilie, Brussels, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed Dec. 10, 1975, Ser. No. 639,602

Claims priority, application France, Dec. 16, 1974, 74.41707

Int. Cl.² C01B *35/12*

U.S. Cl. 423—283 **12 Claims**

1. In a process for producing boric acid by carboammoniac attack of a borate mineral, the improvement wherein the process is performed on borosodim mineral in finely ground form and the process comprises the steps of:

1. treating the finely ground mineral in an aqueous sodium bicarbonate;
2. separating the sodium bicarbonate precipitated during said treating step from the mother liquor produced therein
3. cooling such mother liquor in order to obtain crystals of an ammonium borate;
4. separating such crystals from the remaining mother liquor;
5. redissolving the separated crystals of step (4) to obtain an ammonium solution;
6. applying heat to the obtained solution of step (5) in order to decompose the ammonium borate to form ammonia an a boric acid solution;
7. separating the acid from such boric acid solution by crystallization; and
8. conveying the ammonia formed during said heat applying step (6) to serve as at least part of the ammonia treating the mineral in said treating step (1).

4,022,872

PROCESS FOR PREPARING FINELY-DIVIDED REFRACTORY POWDERS

Donald R. Carson, Barberton, and Calvin B. Holden, Doylestown, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 12, 1975, Ser. No. 631,241

Int. Cl.² C01B *35/04*

U.S. Cl. 423—297 **15 Claims**

1. In the process of producing refractory metal boride, carbide, silicide, nitride, and sulfide powder of a metal selected from groups III-IV and the ferro metals of group VIII of the Periodic Chart of the Elements by gas phase reaction of reactants (a) halide of the selected metal and (b) a source of boron, carbon, silicon, nitrogen or sulfur respectively in the presence of hydrogen, wherein the reactants are mixed with a heated gas stream produced by a gas vortex stabilized plasma arc heater and reacted in a reactor, the improvement which comprises passing plasma gas through said arc heater to thereby provide a heated gas stream with a vortical flow pattern, mixing with said heated gas a cancelling amount of cooler attenuating gas, said attenuating gas having a flow pattern opposite to the heated gas, thereby providing a well-collimated hot gas stream capable of sustaining said gas phase reaction, forwarding said well-collimated gas stream to said reactor, introducing reactants into said well-collimated gas stream, and removing finely divided refractory metal powder from said reactor.

4,022,873

PROCESS FOR THE PRODUCTION OF ALKALI SILICOFORMIC CYANIDE

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 598,999, July 25, 1975, abandoned. This application July 1, 1976, Ser. No. 701,594

Int. Cl.² C01B *33/00*

U.S. Cl. 423—325 **2 Claims**

1. The method of preparing alkali metal silicoformic cyanide compounds by the following steps:

a. mixing together in water, granular silicoformic acid and an alkali metal cyanide compound selected from the group consisting of sodium cyanide, potassium cyanide, lithium cyanide, cesium cyanide and mixtures thereof, in the ratio of 1 part by weight of silicoformic acid to 1 to 2 parts by weight of the alkali metal cyanide;

b. evaporating water from said mixture, thereby producing a brown granular mixture of alkali metal silicoformic cyanide with the general formula, RH_2 SiO_2CN, and dialkali metal silicoformic dicyanide with the general formula $R_2SiO_2(CN)_2$, wherein R is an alkali metal;

c. adding water to said mixture; dialkali metal silicoformic dicyanide goes into solution and is filtered off, thereby recovering brown granules of alkali metal silicoformic cyanide;

d. evaporating water from aqueous solution of dialkali metal silicoformic dicyanide, thereby recovering brown, soft granules of dialkali metal silicoformic dicyanide.

4,022,874

PROCESS FOR THE PRODUCTION OF SODIUM PERCARBONATE

Paul Mollard, Sainte Foy les Lyon, and Louis Mesaros, Oullins, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed July 11, 1974, Ser. No. 487,613

Claims priority, application France, July 20, 1973, 73.26674

Int. Cl.² C01B *15/10*

U.S. Cl. 423—415 P **5 Claims**

1. A process for the preparation of sodium percarbonate responding substantially to the formula $2Na_2CO_3.3H_2O_2$ which process comprises reacting hydrogen peroxide having a perox-

ide strength between about 60 percent and 80 percent with solid crystalline sodium carbonate, the carbonate being the monohydrate or a hydrate containing from 75 to 90 percent Na_2CO_3, to obtain the percarbonate, the reaction being carried out in the absence of an inert organic medium.

4,022,875

METHOD FOR THE PREPARATION OF VITREOUS CARBON FOAMS

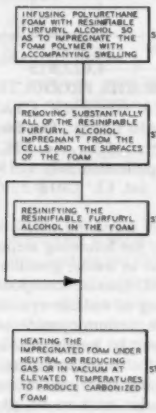
Clarence S. Vinton, and Charles H. Franklin, both of Ann Arbor, Mich., assignors to Chemotronics International, Inc., Ann Arbor, Mich.

Filed Nov. 24, 1975, Ser. No. 634,615

The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.

Int. Cl.² C01B *31/00, 31/02*

U.S. Cl. 423—445 **5 Claims**


INFUSING POLYURETHANE FOAM WITH RESINIFIABLE FURFURYL ALCOHOL SO AS TO IMPREGNATE THE FOAM POLYMER WITH ACCOMPANYING SWELLING
STEP 1
REMOVING SUBSTANTIALLY ALL OF THE RESINIFIABLE FURFURYL ALCOHOL IMPREGNANT FROM THE CELLS AND THE SURFACES OF THE FOAM
STEP 2
RESINIFYING THE RESINIFIABLE FURFURYL ALCOHOL IN THE FOAM
STEP 3
HEATING THE IMPREGNATED FOAM UNDER NEUTRAL OR REDUCING GAS OR IN VACUUM AT ELEVATED TEMPERATURES TO PRODUCE CARBONIZED FOAM
STEP 4

1. The method for forming a vitreous carbon foam which comprises:

a. infusing an unreticulated flexible polyurethane foam with substantially unresinified but resinifiable furfuryl alcohol so as to cause the foam to swell by infusion of the furfuryl alcohol;

b. removing substantially all of the non-infused furfuryl alcohol from within the cells and from the surfaces of the foam;

c. resinifying the furfuryl alcohol in the foam to form a thermoset resin wherein the infusing, removing of the excess and resinifying of the furfuryl alcohol produces a resulting weight up to about six times the weight of the foam alone;

d. carbonizing the foam under neutral, non-oxidizing or reducing gas or vacuum conditions in an oven which rapidly heats the foam to a temperature sufficient to obtain carbonization, thereby allowing crack-free carbonization to be achieved in less than about 5 hours at a rate of temperature change which causes cracking of the foam when substantial resinified furfuryl alcohol remains on the surfaces; and,

e. producing the crack-free vitreous carbon foam with a shape corresponding to the unreticulated polyurethane foam.

4,022,876

MASS SPECTROMETRIC IMMUNOASSAY

Michael Anbar, Palo Alto, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed June 21, 1973, Ser. No. 372,197

Int. Cl.² G01N *33/16;* **G21H** *5/02;* **B01D** *59/44*

U.S. Cl. 424—1 **6 Claims**

1. The method of making an immunological assay of a sample contining an unknown amount of an antigen or antibody comprising:

preparing a solution containing a known amount of one of said antigens or antibodies, when the sample contains the other, tagged with a stable isotope or a long lived radioisotope,

mixing said sample with said solution to produce a mixture of tagged bound and unbound antigens or antibodies,

separating said bound from said unbound, and

applying said bound or said unbound to a negative ion mass spectrometer for counting the number of ions of tagging material whereby the amount of antigens or antibodies in said sample are determined.

4,022,877

RADIOACTIVE LABELED ORGOTEIN

Wolfgang Huber, Atherton; Mark G. Saifer, Berkeley, and Lewis D. Williams, Menlo Park, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.

Filed Sept. 9, 1975, Ser. No. 611,656

Int. Cl.² A61K *29/00, 43/00*

U.S. Cl. 424—1 **10 Claims**

1. Orgotein radioactively labeled with chelated ^{99m}Tc.

5. An iodinated tyrosine-containing orgotein congener iodinated with a radioactive isotope of iodine.

4,022,878

METHODS AND COMPOUNDS FOR PRODUCING SPECIFIC ANTIBODIES

Stanley J. Gross, Encino, Calif., assignor to Biological Developments, Inc., Encino, Calif.

Division of Ser. No. 253,632, May 15, 1972, abandoned, which is a continuation-in-part of Ser. Nos. 45,558, June 11, 1970, abandoned, and Ser. No. 89,929, Nov. 16, 1970, abandoned. This application Nov. 29, 1974, Ser. No. 528,044

Int. Cl.² G01N *33/00;* **A61R** *39/00;* **G01N** *33/16*

U.S. Cl. 424—1.5 **8 Claims**

1. In the method of assaying for the presence and quantity of a hapten or an antigen employing radiation-based immunoassaying, the improvement which comprises producing antibodies which are specific for native homologous hapten or antigen comprising (1) administering to an animal an antibody producing dose of an artificial antigen wherein an immunogenic carrier is bound to a hapten through a ring atom of the hapten by replacement of a biologically inactive substituent, where such substituent is not a determinant, in such manner as to leave the determinant functional groups of said hapten free, (2) obtaining a crude mixture containing antibodies from said animal, (3) isolating antibodies from said crude mixture, (4) and employing said antibodies in a radiation-based immunoassay together with a radiation label, whereby the amount of said antibodies reacting with the hapten or antigen can be measured.

4,022,879

ORAL HYGIENE PRODUCT FOR ANIMALS

Ursula Dietrich, San Mateo, Calif., assignor to Deepen Enterprises, Inc., San Mateo, Calif.

Filed Dec. 19, 1973, Ser. No. 426,151

Int. Cl.² A61K *7/16*

U.S. Cl. 424—49 **3 Claims**

1. A toothpaste composition useful for brushing of carnivorous pets' teeth consisting essentially of a physiologically acceptable mildly abrasive composition, comprising a mixture

of kaolin and calcium carbonate, a humectant, a small but sufficient amount of aluminum hydroxide to provide a neutral or mildly basic pH, water, and a small but sufficient amount of a meat flavoring agent.

4,022,880

ANTICALCULUS COMPOSITION

Leonard J. Vinson, Glen Rock, and Lewis P. Cancro, River Vale, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 401,001, Sept. 26, 1973, which is a continuation of Ser. No. 194,573, Nov. 1, 1974, abandoned, and a continuation-in-part of Ser. No. 879,931, Nov. 25, 1969, abandoned. This application Aug. 11, 1975, Ser. No. 603,826

Int. Cl.² A61K *7/16*

U.S. Cl. 424—49 **20 Claims**

1. An oral composition capable of retarding the development of dental calculus consisting essentially of from about 0.05% to about 4% zinc ions and about 0.03% to about 0.5% of a non-toxic, organoleptically acceptable antibacterial agent capable of inhibiting the growth of gram-positive oral microflora for at least about three hours in an orally acceptable medium, said antibacterial agent being selected from the group consisting of 3,4′,5-tribromosalicylanilide, the zinc derivative of 3,4′,5-tribromosalicylanilide, 3,4′,5-trichlorosalicylanilide, the zinc derivative of 3,4′,5-trichlorosalicylanilide, 3,5-dibromo-4′-trifluromethylsalicylanilide, the zinc derivative of 3,5-dibromo-4′-trifluoromethylsalicylanilide, 2,4,4′-trichloro-2′-hydroxydiphenyl ether, tyrothricin, chlorhexidine digluconate, chlorhexidine diacetate, quaternary ammonium compounds wherein said quaternary ammonium compounds are diisobutylphenoxyethoxyethyldimethylbenzylammonium chloride, diisobutylcresoxyethoxyethyldimethylbenzylammonium chloride, N-methyl-N-(2-hydroxyethyl)-N-(2-hydroxydodecyl)N-benzyl ammonium chloride, cetyl trimethylammonium bromide, stearyl trimethylammonium bromide, oleyl dimethylethylammonium bromide, lauryldimethylchlorethoxyethylammonium chloride, lauryldimethylbenzylammonium chloride, alkyl(C_8-C_{18}) dimethyl (3,4-dichlorobenzyl)-ammonium chloride, lauryl isoquinolinium bromide, N(lauroyloxyethylaminoformylmethyl)pyridinium chloride, and mixtures thereof.

4,022,881

DENTIFRICE

Brian Rae Hawking, Twickenham, England, assignor to Beecham Group Limited, Great Britain

Filed June 10, 1975, Ser. No. 585,699

Claims priority, application United Kingdom, June 18, 1974, 26886/74

Int. Cl.² A61K *7/18*

U.S. Cl. 424—52 **4 Claims**

1. A toothpaste formulation comprising about 20% w/w glycerine, about 5% w/w of 70% w/w of sorbitol solution, about 20% water, about 45% water-insoluble abrasive and about 0.1–5% w/w of combined thickening agent effective in the presence of a fluorine-containing compound and which makes the toothpaste formulation stable to degradation and resistant to syneresis, said combined thickening agent being about 90% sodium carboxymethylcellulose blended with about 10% hydroxyethylcellulose having a viscosity greater than 1500 cps in a 1% aqueous solution as measured in a Brookfield Viscometer.

4,022,882

GERMICIDAL SOLUTIONS AND METHODS FOR PRESERVING AND PURIFYING MILK, OTHER BEVERAGES, FOODS, WATER AND SEWAGE EFFLUENT

Hollis Ely, Bourbonnaise, Ill., assignor to Joan A. Hammel, Joliet, Ill. and Richard J. Hammel, Brookfield, Wis., part interest to each

Continuation-in-part of Ser. No. 485,526, July 3, 1974, which is a continuation-in-part of Ser. No. 285,045, Aug. 30, 1972, which is a continuation-in-part of Ser. Nos. 849,143, Aug. 11, 1969, and Ser. No. 262,707, June 14, 1972, abandoned. This application Jan. 15, 1976, Ser. No. 649,343

Int. Cl.² A23L *2/18*

U.S. Cl. 424—80 **2 Claims**

1. A germicidal solution, consisting essentially of hydrazine, elemental iodine,
polyvinyl pyrrolidone,
and water dissolving the other constituents,
the hydrazine being in a quantity sufficient to cause the iodine to dissolve in the water and to overcome the color of the iodine,
said iodine and said polyvinyl pyrrolidone being in approximately the following proportions:
100 grams of the iodine,
and 20–100 grams of the polyvinyl pyrrolidone.

4,022,883

COMPOSITION FOR ALLEVIATION OF UREMIC SYMPTOMS AND METHOD FOR ITS PREPARATION

Kai Martin Setala, Helsinki, Finland, assignor to Bioscal GmbH, Flensburg, Germany

Filed Mar. 18, 1975, Ser. No. 559,525

Claims priority, application Germany, Mar. 23, 1974, 2414156

Int. Cl.² A61K *37/00*

U.S. Cl. 424—93 **6 Claims**

1. Method for alleviating uremic symptoms in persons suffering from renal failure comprising administering orally thereto an effective dosage of a cell mass of a non-pathogenic soil bacteria selected from the group consisting of an urea degrading bacteria, a creatine degrading bacteria, a creatinine degrading bacteria and an uric acid degrading bacteria.

4,022,884

GARDIMYCIN AND PROCESS FOR PRODUCING SAME

Francesco Parenti; Carolina Coronelli; Giorgio Tamoni, all of Milan, and Giancarlo Lancini, Pavia, all of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed July 17, 1975, Ser. No. 596,702

Claims priority, application United Kingdom, July 27, 1974, 33283/74

Int. Cl.² A61K *35/74*

U.S. Cl. 424—117 **7 Claims**

4. The antibiotic substance gardimycin having the following characteristics (as the monosodium salt):
1. Melting point: 260° C (decomposition);
2. Molecular weight: 2005–2168;
3. Elemental analysis: C=48.7–48.6%; H=6.7–6.6% N=11.8–12.2%; S=5.3–5.5%; Na=1.1%; H_2O=3.6–3.3%;
4. U.V. absorption bands: In each of the below outlined solvent systems, gardimycin shows the following values:

Solvent	λ(m) max	$E_{1cm}^{1\%}$ cm.
methanol	273 (shoulder)	
	280	26
	299	24
sodium hydroxide 0.1N	273 (shoulder)	
	279	26
	288	22
hydrochloric acid 0.1N	273 (shoulder)	
	279	26
	288	22

-continued

Solvent	λ(m) max	$E_1^{1\%}$ cm.
phosphate buffer pH. 7.38	273 (shoulder)	
	279	24
	288	20

The complete picture of the spectrum is given in FIG. 1;

5. Infrared spectrum: characteristic absorption bands in nujol have been observed at the following frequencies (cm^{-1}): 3280, 2920–2840 (nujol), 1650, 1520, 1455 (nujol), 1375 (nujol), 1260, 1045, 990, 720;

The complete picture of the spectrum is given in FIG. 2;

6. Specific rotation: $[\alpha] = -44°$ (c = 0.58% dimethylformamide);
7. Solubility: soluble in water, aqueous sodium bicarbonate, diluted aqueous solutions of alkali hydroxides, hot methanol, dimethylformamide, dimethylsulfoxide, glacial-acetic acid. Insoluble in diluted mineral acids, benzene, acetone, chloroform, carbon tetrachloride, (C_{2-6})-aliphatic alkanols, tetrahydrofuran;
8. Characteristic reactions:

Fehling	positive
Tollens	positive
$KMnO_4$	positive
H_2SO_4conc.	positive
Ninhydrin	negative
$FeCl_3$	negative
Million	negative
Schiff	negative
Maltol	negative

9. Ionizale functions: an ionizable function is potentiometrically evidenced with pK_a =7.1 (water) and pK_a=8.5 (methylcellosolve:water= 16:4);
10. Isoelectric point: 4.2 (determined by electrofocalization);
11. R_f values:

Chromatography on Whatman paper No. 1 Visualization of the spots by microbiological development on *Staphylococcus aureus*	R_f values
ELUTING SYSTEM	
1) Butanol saturated with phosphate buffer M/15 pH 6.0	0.15
2) Butanol saturated with water containing 2% of p-toluenesulfonic acid	0.80
3) Butanol saturated with water containing 2% of ammonium hydroxide	0.10
4) Phosphate buffer M/15 pH 6.0 saturated with butanol	0.80
5) 20% aqueous solution of sodium chloride	0.80
6) Butanol:methanol:water=40:10:20 with 0.75% of methyl orange	0.65
7) Butanol:methanol:water=40:10:20	0.60
8) Acetone:water=1:1	0.80
9) Ethyl acetate saturated with water	0.00
Thin-layer chromatography on silicagel. Visualization of the spots by sulfuricacid and vanilline and microbiological development on *Staphylococcus aureus*	
ELUTING SYSTEM	
Ammonium hydroxide:ethanol-water=1:8:1	

The antibiotic being further characterized by the following approximate ratio of amino-acids of identified structure:

Amino-acid	Approximate ratio
Valine	2
Serine	1

-continued

Amino-acid	Approximate ratio
Glycine	2
Glutamic acid	1
Isoleucine	2
Leucine	1
Alanine	1
Tryptophan	1

4,022,885
POLYCYCLIC ETHER ANTIBIOTIC

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett; John R. Oscarson, both of Groton, and John B. Routien, Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,421
Int. Cl.² A61K *35/74*
U.S. Cl. 424—122 **7 Claims**

1. The antibiotic Compound 38,986, or the cationic salts thereof, said antibiotic when in the form as the free acid having an optical rotation of $[\alpha]_D^{25°} = -7.5°$ at a concentration of 1% in acetone; an average composition by weight of 65.11% carbon, 9.54% hydrogen and 25.35% oxygen (by difference); and, when pelleted in KBr, exhibiting characteristic absorption in the infrared region at the following wavelengths in microns: 2.98, 3.44, 5.75, 5.78, 6.85, 7.24, 7.98, 8.38, 8.65, 9.00, 9.23, 9.42, 9.67, 9.83, 10.10, 10.38, 10.92, 11.18, 11.45, 11.85, 13.40, 13.70 and 14.10.

4,022,886
METHOD OF RECOVERING MYCOHEPTIN

Evgeny Davidovich Etingov, ulitsa Zvezdnaya, 8, kv. 43; Alexandr Pavlovich Bashkovich, prospekt M.Toreza, 40, korpus 7, kv. 21; Valter Osvaldovich Kulbakh, ulitsa Bukharestskaya, 86, korpus 1, kv. 85; Valentina Yakovlevna Raigorodskaya, prospekt Narodnogo opolchenia, 131, kv. 126; Inessa Vladimirovna Popova, V. O. 2 linia, 25, kv. 27; Ljudmila Evgenievna Alexeeva, ulitsa Krasnoputilovskaya, 14, kv. 69; Vladimir Semenovich Nyn, Svetlanovsky prospekt, 52, kv. 50, and Nadezhda Dmitrievna Lokhina, ulitsa Kupchinskaya, 19, korpus 3, kv. 99, all of Leningrad, U.S.S.R.

Filed Aug. 12, 1975, Ser. No. 604,062
Int. Cl.² A61K *35/00*
U.S. Cl. 424—123 **3 Claims**

1. Method of recovering mycoheptin which comprises extracting mycoheptin from the mycelium of Streptoverticillium mycoheptinicum containing the same with a 65 to 80-percent aqueous solution of isopropanol containing 1 to 10 percent calcium chloride by weight and from 10 to 15 percent methylene chloride by weight, precipitating the mycoheptin therefrom, washing the precipitated mycoheptin with an aqueous solution of isopropanol, dissolving said washed mycoheptin in dimethylformamide, reprecipitating the mycoheptin from said dimethylformamide solution with water, and treating the resulting reprecipitated product with a 20 to 50-percent aqueous solution of n-propanol containing 0.2 to 0.5 percent sodium hexametaphosphate by weight.

4,022,887
CARIOSTATIC COMPOSITIONS AND METHOD OF APPLICATION

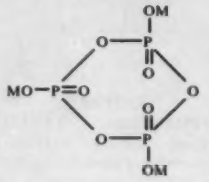
Robert S. Harris, Waban, and Abraham E. Nizel, Newton Centre, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 39,167, May 20, 1970, abandoned, which is a continuation-in-part of Ser. No. 659,578, Aug. 10, 1967, abandoned, which is a continuation of Ser. No. 457,187, May 19, 1965, abandoned, which is a continuation of Ser. No. 219,120, Aug. 23, 1962, abandoned. This application May 24, 1972, Ser. No. 256,470

Int. Cl.² A61K *5/00*

U.S. Cl. 424—128 **4 Claims**

1. A method of inhibiting caries in live human teeth which comprises orally administering to the human a non-toxic cariostatic amount of a cyclic phosphate of the formula



where M is sodium or potassium, in an ingestible carrier.

4,022,888
ESTERIFIED ORGOTEIN

Wolfgang Huber, Atherton; Mark G. Saifer, Berkeley, and Lewis D. Williams, Menlo Park, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.

Filed Sept. 9, 1975, Ser. No. 611,659

Int. Cl.² A61K *37/02, 37/14;* C07G *7/04*

U.S. Cl. 424—177 **10 Claims**

1. An esterified orgotein wherein up to 8 of the free carboxylic acid groups of the orgotein protein molecule are esterified with a physiologically acceptable group, and the esterified acid groups are -COOR, wherein R is alkyl of 1–4 carbon atoms, $CH(phenyl)_2$ or $—CH_2COX$, wherein X is OCH_3, OC_2H_5, NH_2, $NHCH_2CONH_2$ or CH_2CH_2 phenyl.

9. A pharmaceutical composition having antiinflammatory activity comprising, in admixture with a pharmaceutically acceptable carrier, an anti inflammatorily effective amount per unit dosage of an orgotein ester of claim **1.**

4,022,889
THERAPEUTIC COMPOSITIONS OF ANTIBIOTIC U-44,590 AND METHODS FOR USING THE SAME

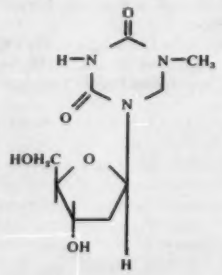
Brian Bannister; Clarence DeBoer, both of Kalamazoo, and Harold E. Renis, Portage, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 471,309, May 20, 1974, abandoned. This application June 12, 1975, Ser. No. 586,232

Int. Cl.² A61K *31/71*

U.S. Cl. 424—181 **32 Claims**

1. A therapeutic composition comprising, in unit dosage form, from about 25 to about 500 mg. of a compound of the formula



in combination with a pharmaceutical carrier.

4,022,890
SAFENED PESTICIDAL COMPOSITIONS

Harold Ernest Alier, Norristown, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed July 7, 1975, Ser. No. 594,147

Int. Cl.² A01N *9/36, 9/02*

U.S. Cl. 424—225 **6 Claims**

1. A safened insecticidal composition which comprises an insecticidally-effective amount of O-ethyl S-n-propyl O-2,4,6-trichlorophenyl phosphorothiolate and, as a safening agent, an amount effective to limit phytotoxicity of methoxychlor or 1,1-dichloro-2,2-bis(4-ethylphenyl)ethane, wherein the weight ratio of the phosphorothiolate to the safening agent is about 1:2 to about 1:4.

4,022,891
NOVEL 1α,24-DIHYDROXYCHOLECALCIFEROL COMPOSITIONS, NOVEL PRECURSORS THEREOF, AND PROCESSES FOR PREPARING THEM

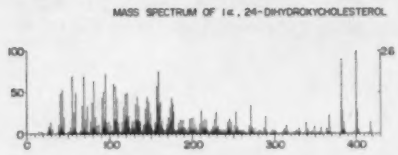
Toru Takeshita, Hino; Yoshinobu Hashimoto, Fujisawa; Hiroyuki Kawashima, Hino; Sachio Ishimoto, Tokyo; Nobuo Ikekawa, Tokyo, and Masuo Morisaki, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed June 2, 1975, Ser. No. 583,115

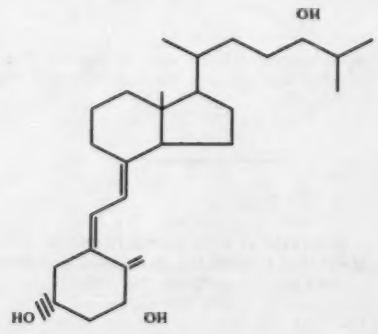
Claims priority, application Japan, June 18,1974, 49-68664, Dec. 9, 1974, 49-141,239, Dec. 9, 1974, 49-141,330, Dec. 9, 1974, 49-141,332, Dec. 9, 1974, 49-141,332, Dec. 27, 1974, 49-149,017, Dec. 27, 1974, 49-149,018, Dec. 27, 1974, 49-149,020, Dec. 27, 1974, 49-149,021, Dec. 27, 1974, 49-149,022

Int. Cl.² A61K *31/59*

U.S. Cl. 424—236 **36 Claims**



1. A mixture in arbitrary ratios of 1α,24(S)-dihydroxycholecalciferol and 1α,24(R)-dihydroxycholecalciferol expressed by the following formula



18. A pharmaceutical composition for warm-blooded animals according to claim **17** which is administrable orally or by intramuscular or intravenous injection, said composition comprising a pharmaceutically effective amount of at least one of the 1α,24(S)- and 1α,24(R)-dihydroxycholecalciferols of

formula (5-a) and a vehicle non-toxic to warm-blooded animals.

4,022,892

17β-ETHYNYL-3,17α-ESTRADIOL AND DERIVATIVES THEREOF

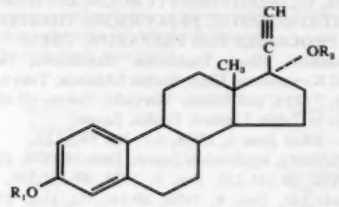
Ramesh Maganlal Kanojia, Somerville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Continuation-in-part of Ser. No. 393,873, Sept. 4, 1973, Pat. No. 3,983,112. This application July 2, 1975, Ser. No. 592,574

Int. Cl.² A61K *31/56*

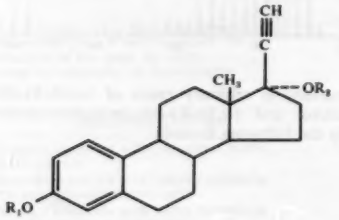
U.S. Cl. 424—238 **24 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen, lower alkyl having 2 – 5 carbon atoms, cycloalkyl, or lower acyl having 2 – 6 carbon atoms and R_2 is hydrogen or lower acyl having 2 – 6 carbon atoms.

14. A method of inhibiting fertility in female animals which comprises orally administering to a female animal an effective non-toxic amount of a compound of claim 1 of the formula:



wherein R_1 is hydrogen, lower alkyl having 1 – 5 carbon atoms, cycloalkyl or lower acyl, and R_2 is hydrogen or lower acyl.

4,022,893

TREATMENT FOR HYPERTENSION

John H. Moyer, 556 Colgate Ave., Johnstown, Pa. 15905

Filed Jan. 24, 1975, Ser. No. 543,697

Int. Cl.² A61K *31/54, 31/135*

U.S. Cl. 424—246 **9 Claims**

1. The method of treating essential hypertension in human beings, which comprises administering concomitantly effective amounts of phenoxybenzamine and propranolol in a quantity not exceeding 60 mg. daily of phenoxybenzamine and not exceeding 360 mg. daily of propranolol.

4. A tablet for conjoint use containing 10 mg. of propranolol and 2.5 mg. of dibenzyline.

4,022,894

STABLE SOLUTION OF BENZTHIAZIDE (3-[BENZYTHIOL METHYL]-6-CHLORO-2H-1,2,4-BENZOTHIADIAZINE-7-SULFONAMIDE 1,1-DIOXIDE) SUITABLE FOR PARENTERAL ADMINISTRATION AND PROCESS OF PREPARATION

Samuel M. Fainberg, 4239 Barcelos Drive, and Porfirio F. Perez, 4322 Martyridge, both of St. Louis, Mo. 63129

Filed Mar. 3, 1975, Ser. No. 554,675

Int. Cl.² A61K *31/54*

U.S. Cl. 424—246 **16 Claims**

1. A clear stable solution of benzthiazide suitable for parenteral or peroral administration which comprises benzthiazide dissolved in an effective amount of an aqueous polyalkalene glycol solution and having a pH suitable for injection.

4,022,895

SUBSTITUTED PHENYLGLYCYLCEPHALOSPORINS

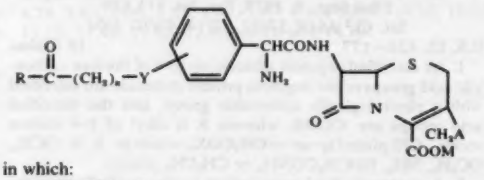
John Gerald Gleason, Cornwells Heights, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 384,771, Aug. 1, 1973, Pat. No. 3,953,439. This application Dec. 15, 1975, Ser. No. 640,998

Int. Cl.² C07D *501/20*

U.S. Cl. 424—246 **17 Claims**

1. A compound of the formula:



in which:

Y is O, NH or S;

n is one to five;

R is NH_2 or OR′, where R′ is hydrogen or lower alkyl of from one to four carbon atoms;

M is hydrogen or an alkali metal or ammonium cation; and

A is SR′ or OR′, where R′ is hydrogen or alkyl of from one to four carbon atoms

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4,022,896

XANTHENE AND THIOXANTHENE COMPOSITIONS AND METHOD OF TREATING

Georg Ujvari, Nykobing S, and Peter Bregnedal Hansen, Horsholm, both of Denmark, assignors to Kefalas A/S, Copenhagen-Valby, Denmark

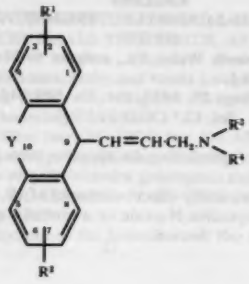
Division of Ser. No. 525,967, Nov. 21, 1974, Pat. No. 3,951,961. This application Mar. 1, 1976, Ser. No. 662,331

Claims priority, application United Kingdom, Nov. 30, 1973, 55759/73

Int. Cl.² A61K *31/395, 31/445*

U.S. Cl. 424—250 **15 Claims**

1. A pharmaceutical composition, useful as a tranquilizer or neuroleptic and for the treatment of psychoses, in unit dosage form, comprising a major quantity of a pharmaceutical carrier and as an active ingredient a pharmaceutically effective dose of a compound selected from the group consisting of 1) a compound of the following formula:



wherein Y is selected from the group consisting of sulphur and oxygen, R^1 is selected from the group consisting of hydrogen, chlorine, trifluoromethyl and dimethylsulfamoyl, R^2 is selected from the group consisting of hydrogen and fluorine, and R^3 and R^4 taken together with the nitrogen atom form a ring selected from the group consisting of a piperazine and a piperidine ring, such rings substituted in the 4-position by a substituent selected from a methyl group, a 2-hydroxyethyl group, and a 2-hydroxyethyl group esterified with an aliphatic carboxylic acid having from one to seventeen carbon atoms inclusive, and 2) a non-toxic acid addition salt thereof.

4,022,897

CNS ACTIVE COMPOUNDS

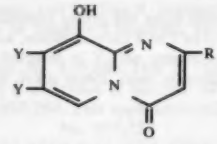
Harry Louis Yale, New Brunswick, and John T. Sheehan, Middlesex, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 448,133, March 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 181,565, Sept. 17, 1971, abandoned, and a continuation-in-part of Ser. No. 256,253, May 24, 1972, abandoned. This application Apr. 17, 1975, Ser. No. 569,132

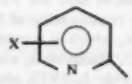
Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **19 Claims**

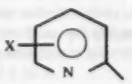
1. A compound of the formula



wherein Y is hydrogen, alkyl of from 1 to 4 carbon atoms, CF_3, F, Cl or Br provided each Y may be hydrogen and R is a straight or branched chain alkyl radical of from 1 to 10 carbon atoms, and pharmaceutically acceptable acid addition salts thereof and amine salts of the formula $NH(R_1)(R_2)$ wherein R_1 and R_2 are the same or different and are selected from the group consisting of hydrogen, alkyl of 1–4 carbons, or

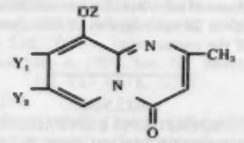


wherein X is H, or OH, provided only one of R_1 and R_2 is H, and provided when one of R_1 and R_2 is



the other is H.

17. A compound of the structure



wherein Z is selected from the group consisting of o-bromobenzyl, allyl, 2,4-dichlorobenzyl, 2-bromo-4-chlorobenzyl, 2-phenethyl, cinnamyl, m-(trifluoromethyl)benzyl, o-cyanobenzyl, p-methoxybenzyl, p-(N,N-dimethylsulfamoyl)cinnamyl, 3-chloro-2-butenyl, p-(methylthio)benzyl, o-(carbomethoxy)benzyl, o-(trifluoromethyl)benzyl, p-(trifluoromethyl)-benzyl, o-chlorobenzyl, 2-propynyl, or benzyl, Y_1 and Y_2 are hydrogen except in the case where Z is cinnamyl, Y_1 is hydrogen or methyl.

4,022,898

2-AMINO-4-PYRIMIDYL-1,4-DIHYDROPYRIDINE DERIVATIVES

Horst Meyer, Wuppertal; Friedrich Bossert, Wuppertal-Elberfeld; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

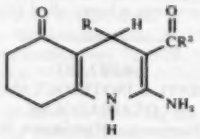
Division of Ser. No. 438,603, Feb. 1, 1974, Pat. No. 3,929,798, which is a division of Ser. No. 336,639, Feb. 28, 1973, Pat. No. 3,867,393. This application May 7, 1975, Ser. No. 575,369

Claims priority, application Germany, Sept. 12, 1972, 2210674

Int. Cl.² C07D *239/24*

U.S. Cl. 424—251 **4 Claims**

1. A compound of the formula:



wherein

R is pyrimidyl, unsubstituted or substituted by one or two members selected from the group consisting of lower alkyl, lower alkoxy and halogeno; and

R^3 is lower alkoxy or lower alkoxy (lower alkoxy).

3. The method of effecting coronary vessel dilation and a reduction in blood pressure in an animal which comprises administering thereto an effective amount of a compound according to claim 1.

4,022,899

SYNERGISTIC LOCAL ANESTHETIC COMPOSITIONS

Herbert J. F. Adams, Westboro, and Bertil H. Takman, Worcester, both of Mass., assignors to Astra Pharmaceutical Products, Inc., Worcester, Mass.

Division of Ser. No. 369,302, June 12, 1973, Pat. No. 3,966,934, and a continuation-in-part of Ser. No. 206,181, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 109,942, Jan. 26, 1971, abandoned. This application Dec. 10, 1975, Ser. No. 639,439

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **26 Claims**

1. An injectable local anesthetic composition having long-lasting local anesthetic effect which is a solution consisting essentially of a pharmaceutically acceptable carrier having dissolved therein

a. an aminoalkyl benzoate local anesthetic compound in a

concentration of from 0.05% to 5% by weight of the carrier and

b. a toxin selected from the group consisting of from 0.5 to 10 micrograms of tetrodotoxin per milliliter of the carrier and from 10 to 20 micrograms of desoxytetrodotoxin per milliliter of the carrier.

4,022,900

COMPOSITIONS CONTAINING 1,2,3,4-TETRAHYDROISOQUINOLINES USED AS HYPOTENSIVE AGENTS

Ian William Mathison, Memphis, Tenn., assignor to Marion Laboratories, Inc., Kansas City, Mo.

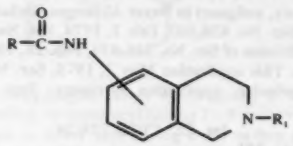
Continuation-in-part of Ser. No. 70,900, Sept. 9, 1970, which is a continuation-in-part of Ser. No. 715,946, March 26, 1968, Pat. No. 3,674,791. This application Dec. 11, 1972, Ser. No. 314,273

The portion of the term of this patent subsequent to July 4, 1989, has been disclaimed.

Int. Cl.[2] A61K *31/47*

U.S. Cl. 424—258 **10 Claims**

1. A method of lowering blood pressure in a hypertensive animal which comprises administering to said animal, in an amount effective to lower the blood pressure, a compound of the formula



or a nontoxic acid addition salt thereof, wherein R is a nuclear substituted phenyl group containing one to three lower alkoxy groups and R_1 represents a lower alkyl group.

4,022,901

3-PYRIDINYL-5-ISOTHIOCYANOPHENYL OXADIAZOLES

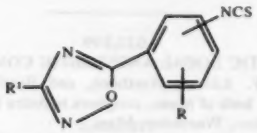
Venkatachala L. Narayanan, Hightstown, N.J.; Hans H. Gadebusch, Yardley, Pa., and Rudiger D. Haugwitz, Titusville, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Mar. 5, 1975, Ser. No. 555,511

Int. Cl.[2] A01N *9/18*

U.S. Cl. 424—263 **5 Claims**

1. A method for treating fungal infections and/or bacterial infections, which comprises administering to a mammalian host the composition comprising an effective amount of a compound of the formula



wherein R is selected from the group consisting of hydrogen, halogen, trifluoromethyl, lower alkoxy, phenoxy, di(lower alkyl)-amino, lower alkyl

phenyl, or phenyl substituted with halogen, nitro, trifluoromethyl, lower alkyl or lower alkoxy, and R^1 is pyridinyl in a physiologically acceptable vehicle.

4,022,902

10,11-DIHYDRO-3-CARBOXYCYPROHEPTADIEN-N-OXIDE

David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 29, 1975, Ser. No. 608,944

Int. Cl.[2] C07D *211/94*

U.S. Cl. 424—267 **3 Claims**

1. A method of producing an appetite stimulant and/or antihistaminic effect comprising administering in unitary dosage form a therapeutically effective amount of 10,11-dihydro-3-carboxycyproheptadine-N-oxide or a nontoxic pharmaceutically acceptable salt thereof.

4,022,903

α-THIENYL AND α-SUBSTITUTED THIENYL, PHENYL AND SUBSTITUTED PHENYL CYCLOPROPYLOMETHANOLS USEFUL AS BIODEGRADABLE INSECTICIDES AND MOLLUSICIDES

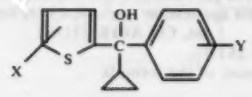
Robert George Stein, Kenosha, Wis., and Terry Lee Couch, Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Continuation of Ser. No. 584,073, June 5, 1975, abandoned. This application Dec. 29, 1975, Ser. No. 644,385

Int. Cl.[2] A01N *9/12*

U.S. Cl. 424—275 **8 Claims**

1. A method of killing mollusks and insects, comprising applying to said mollusks and insects a lethal amount of a solution of a biodegradable compound having the formula:



where X is selected from the group consisting of hydrogen, halo, a lower alkyl of 1 to 8 carbon atoms, and a lower alkoxy of 1 to 8 carbon atoms; and Y is selected from the group consisting of hydrogen, halo, lower alkyl, lower alkoxy and halo lower alkyl.

4,022,904

COMPOSITION AND METHOD OF USE

Gilbert A. Youngdale, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 549,183, Feb. 12, 1975, abandoned, which is a continuation of Ser. No. 510,226, Sept. 30, 1974, abandoned, which is a continuation of Ser. No. 457,764, April 4, 1974, abandoned, which is a continuation of Ser. No. 386,537, Aug. 8, 1973, abandoned, which is a continuation of Ser. No. 328,875, Feb. 1, 1973, abandoned, which is a continuation of Ser. No. 34,856, May 5, 1970, abandoned. This application Dec. 8, 1975, Ser. No. 638,865

Int. Cl.[2] A61K *31/335*

U.S. Cl. 424—278 **6 Claims**

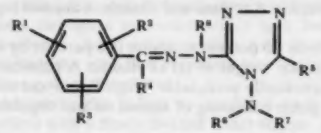
1. A method of rendering male mammals selected from the group consisting of monkeys, rats, hamsters, guinea pigs, gophers, dogs, hares and coyotes sterile which comprises administering systemically by oral or parenteral administration to said male mammals a sterilizing amount of epichlorohydrin.

4,022,905
BENZYLIDENE HYDRAZINO-1,2,4-TRIAZOLES, PHARMACEUTICALS THEREWITH, AND METHOD OF USE

Hans Erik Eriksson, Holo, and Gosta Lennart Florvall, Sodertalje, both of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

Filed Nov. 25, 1975, Ser. No. 635,140
Claims priority, application Norway, Dec. 11, 1974, 4468/74
Int. Cl.² A61K *31/41*; C07D *249/08*
U.S. Cl. 424—269 9 Claims

1. A compound of the formula



I

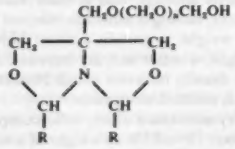
or a pharmaceutically acceptable salt thereof wherein R^1, R^2 and R^3 are the same or different and each represents a hydrogen atom, a lower alkyl group or a halogen atom, R^4 represents a hydrogen atom, a lower alkyl group, R^5, R^6, R^7 and R^8 are the same or different and each represents a hydrogen atom or a lower alkyl group, provided that R^4 is a lower alkyl group when R^1, R^2 and R^3 are hydrogen atoms and that R^6, R^7 and R^8 do not simultaneously represent a hydrogen atom.

4,022,906
BIOCIDAL COMPOSITIONS CONTAINING BICYCLIC POLYOXYMETHYLENEOXAZOLIDINES

Henri Sidi, Paramus, and Hilding R. Johnson, Wayne, both of N.J., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Division of Ser. No. 519,885, Oct. 31, 1974, Pat. No. 3,952,000, which is a division of Ser. No. 447,797, March 4, 1974, Pat. No. 3,890,264. This application Aug. 25, 1975, Ser. No. 607,738
Int. Cl.² A01N *9/22*, *9/28*; C08K *5/34*
U.S. Cl. 424—272 6 Claims

1. A biocidal composition for use in inhibiting the growth of bacteria and fungi in aqueous surface-coating compositions that is an aqueous solution containing 20 percent to 80 percent by weight of a biocidal component that comprises a bicyclic polyoxymethyleneoxazolidine having the structural formula



wherein each R represents hydrogen, alkyl of 1 to 6 carbon atoms, phenyl, halophenyl, or $-(CH_2O)_mCH_2OH$; *m* represents a number in the range of 0 to 2; and *n* represents a number in the range of 1 to 4.

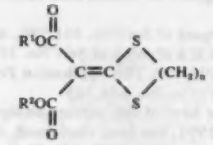
4,022,907
PHARMACEUTICAL COMPOSITIONS CONTAINING 1,3-DITHIACYCLOALKYLIDENE MALONATES

Kuniaki Taninaka, Ibaragi; Hitoshi Kurono, Amagasaki, and Tsutomu Kasai, Sakai, all of Japan, assignors to Nihon Nohyaku Co. Ltd., Tokyo, Japan

Filed June 6, 1975, Ser. No. 584,413
Int. Cl.² A61K *31/385*
U.S. Cl. 424—277 19 Claims

1. A process for preventing or curing fatty liver or hepatitis, preventing liver necrosis or lowering abnormally elevated concentrations of sugar or alcohol in the blood, of animals including humans, which comprises

orally or parenterally administering to a said animal in need of said therapy or prevention, a therapeutic effective amount of a compound having the general formula,



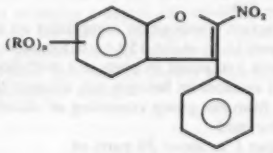
wherein R^1 and R^2, which may be same or different, represent individually a C_1-C_5 alkyl group and *n* represents an integer of 1, 3 or 4.

4,022,908
USE OF CERTAIN 2-NITRO-3-PHENYL-ALKOXYBENZOFURANS IN INHIBITING GROWTH OF MICROORGANISMS AND INTERMEDIATES IN THE SYNTHESIS OF SAID BENZOFURANS

Robert A. Scherrer, White Bear Lake, Minn., assignor to Riker Laboratories, Inc., Northridge, Calif.

Division of Ser. No. 446,006, Feb. 26, 1974, Pat. No. 3,927,037. This application Nov. 3, 1975, Ser. No. 628,329
Int. Cl.² A61K *31/345*; C07D *307/82*, *307/86*
U.S. Cl. 424—285 12 Claims

1. A method for arresting or inhibiting the growth of microorganisms comprising contacting said microorganisms with a compound of the formula



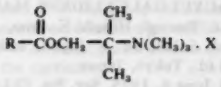
wherein each R is an alkyl group containing from one to six carbon atoms and *n* is 1–3, in an amount sufficient to inhibit the growth of said microorganisms.

4,022,909
METHOD OF INHIBITING THE GROWTH OF BACTERIA USING QUATERNARY AMMONIUM COMPOUNDS

Jerry Hoyt Hunsucker, Terre Haute, Ind., assignor to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed July 6, 1976, Ser. No. 702,786
Int. Cl.² A01N *9/24*
U.S. Cl. 424—312 9 Claims

1. A method of inhibiting the growth of bacteria comprising contacting the bacteria or the environment inhabited by them with a growth inhibiting amount of a compound or mixture thereof represented by the formula:



where R is an aliphatic hydrocarbon group of from 7 to 15 carbon atoms and X is a halogen atom.

4,022,910

L-3-HYDROXYMETHYLTYROSINE AND SALTS THEREOF FOR LOWERING BLOOD PRESSURE

John T. Suh, Mequon, Wis., and Richard A. Schnettler, Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Continuation-in-part of Ser. No. 501,980, Aug. 30, 1974, abandoned, which is a division of Ser. No. 317,800, Dec. 22, 1972, Pat. No. 3,904,680. This application Feb. 9, 1976, Ser. No. 656,103

The portion of the term of this patent subsequent to July 23, 1991, has been disclaimed.

Int. Cl.² A61K *31/195*

U.S. Cl. 424—319 **4 Claims**

1. A pharmaceutical composition comprising a blood-pressure lowering effective amount of a compound selected from the group consisting of L-3-hydroxymethyltyrosine or a pharmaceutically acceptable salt thereof in combination with a pharmaceutical diluent.

4,022,911

DISINFECTANT COMPOSITION COMPRISING A QUATERNARY AMMONIUM COMPOUND, A PHENOL, AND FORMALDEHYDE

Tevis M. Goldhaft; Charles Kaitz, both of Vineland, and George D. Maier, Bridgeton, all of N.J., assignors to Damon Corporation, Needham Heights, Mass.

Continuation of Ser. No. 287,770, Sept. 11, 1972, abandoned, which is a continuation-in-part of Ser. No. 94,538, Dec. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 663,552, Aug. 28, 1967, abandoned. This application May 29, 1975, Ser. No. 581,728

Int. Cl.² A01N *9/02, 9/20, 9/24, 9/26*

U.S. Cl. 424—329 **4 Claims**

1. A disinfectant composition comprising an admixture of
   a. from about 10 to about 150 parts formaldehyde;
   b. from about 1 to about 20 parts of a methyldodecylbenzyl trimethyl ammonium halogen salt wherein the halogen is selected from the group consisting of chlorine, bromine, and iodine; and
   c. from about 1 to about 20 parts of
5 methyl-2-isopropyl-1-phenol.

4,022,912

USE OF 1-DECARBOXY-1-HYDROXYMETHYL-PGE$_1$ IN THERAPEUTIC BRONCHODILATION

Phillip J. Gardiner, Maidenhead, and Cyril Schneider, Whitton Twickenham, both of England, assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed Feb. 9, 1976, Ser. No. 656,159

Int. Cl.² A61K *31/12*

U.S. Cl. 424—331 **3 Claims**

1. A therapeutic method of causing bronchodilation in an individual in whom that therapy is indicated comprising:
   administering to the individual a therapeutically effective amount of 15(S)-1,11α,15α-trihydroxy-9-oxo-13-trans-prostene.

4,022,913

HIGH POTENCY VITAMIN A COMPOSITIONS

Harold Leon Newmark, Maplewood, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 397,192, Sept. 13, 1973, abandoned, which is a continuation of Ser. No. 111,120, Jan. 11, 1971, abandoned, which is a continuation-in-part of Ser. No. 816,106, April 14, 1969, abandoned. This application July 3, 1975, Ser. No. 593,149

Int. Cl.² A61K *31/07*

U.S. Cl. 424—344 **6 Claims**

1. A vitamin A active solution, containing from about 400,000 to about 1 million units of vitamin A per gram of solution, stable against crystallization of vitamin A comprising:
   a. a vitamin A active material consisting of
      i. a vitamin A compound selected from the group consisting of vitamin A acetate and vitamin A alcohol together with
      ii. from about 40 percent to about 100 percent by weight based on the weight of (i) of vitamin A palmitate and
   b. a pharmaceutically acceptable lipophilic solvent selected from the group consisting of animal oil and vegetable oil.

4,022,914

PREPARATION OF YOGURT

Mary B. Moody, 3025 S. Vine St., Denver, Colo. 80210

Filed Jan. 28, 1976, Ser. No. 653,103

Int. Cl.² A23C *9/12*

U.S. Cl. 426—43 **2 Claims**

1. The self-timing method of preparing high quality yogurt without the addition of either heating or cooling energy during yogurt incubation, comprising
   a. heating milk to a temperature near boiling and then cooling the milk to a temperature range from 120° to 145° F.,
   b. adding yogurt starter culture to the milk in said temperature range,
   c. placing the resultant milk and starter culture mixture while in said temperature range in a container at room temperature and having thermal properties that allow the mixture to decline in temperature from said temperature range to approximately 90° F. at the end of a nine hour period, and
   d. incubating the mixture in the container for a time not substantially less than nine hours until the temperature declines from said temperature range to approximately 90° F.

4,022,915

INTERMEDIATE MOISTURE FOOD PRODUCT AND METHOD OF PREPARING THE SAME

Harold Zukerman, Skokie, Ill., assignor to National Can Corporation, Chicago, Ill.

Filed June 28, 1976, Ser. No. 700,611

Int. Cl.² A23K *1/00*

U.S. Cl. 426—72 **19 Claims**

1. A method of producing an intermediate moisture food product that resists spoilage and is shelf stable at ordinary room temperatures, having a moisture content between about 20 and 35% by weight, a protein content between about 20 and 35% by weight, a water activity between about 0.80 and 0.85, and a bulk density between about 20 and 30 pounds per cubic foot, which method comprises:
   a. forming a dry admixture of dry solid components, including from about 15 to 35% by weight of a cereal grain, and from about 20 to 70% by weight of a protein source material, an antimycotic agent and other dry additives reduced to a particle size less than Number 6 mesh, U.S. screen seive;
   b. adding from about 5 to 15% by weight of a polyhydroxy

alcohol bacteriostatic agent and forming a uniform blend thereof with the dry ingredients;

c. admixing from about 1 to about 10% by weight of comminuted fresh meat to the blend of dry ingredients and polyhydroxy alcohol;

d. passing the blended admixture in a confined stream through a precooking zone wherein the blended ingredients are vigorously agitated and the moisture content and temperature thereof are increased by injecting hot water and steam into the agitated mix to produce a hot, moist, essentially unfused granular mix;

e. passing the heated, moist granular mix to an extrusion zone wherein the mix is subjected to compressive agitation and pressures above atmospheric pressure and temperatures above the boiling point of water for a time sufficient to cook the admixture to an essentially non-granular, fused, self-sustaining, cohesive state;

f. extruding the cooked, fused admixture from the extrusion zone through a restricted orifice to a zone of reduced pressure to form self-expanding, rope-like extrudate;

g. cutting the rope-like extrudate into uniform sections to form pellets therefrom;

h. subjecting the pellets to tumbling while spraying the pellets with a finely divided water stream and cold air to reduce their temperature to below about 100° F. and increase the moisture content thereof to a pre-determined level; and

i. coating the pellets with a liquefied edible fat to raise the total fat content of the pellets to at least 7%.

4,022,916

COFFEE-LIKE BEVERAGE AND PROCESS THEREFOR

Diane Jean La Tour, Croton Falls, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Sept. 5, 1975, Ser. No. 610,609

Int. Cl.² A23F *1/00, 1/16*

U.S. Cl. 426—285 **1 Claim**

1. A process for preparing a coffee-substitute beverage comprising the steps of:

a. roasting a mixture of a cereal and a polysaccharide at a temperature above 375° F and for a period between 15 and 200 minutes,

b. aqueously extracting the roasted mixture of step a),

c. drying the aqueous extract to a moisture content of about 2%,

d. blending the dried extract with from 5 to 40% finely divided roasted carob seed,

e. agglomerating the blend of step (d) by means of steam until an agglomerated is produced said agglomerate having a moisture content of between 3 and 5.5% and a bulk density of from 0.25 to 0.33 grams per cc., and

f. further drying the agglomerate to a moisture content of 1 to 3%.

4,022,917

PROCESS FOR PREPARING A STORAGE STABLE PREMIXED BATTER

William M. Selenke, 18 Gambier Circle, Greenhills, Ohio 45218

Continuation-in-part of Ser. No. 313,088, Dec. 7, 1972, abandoned. This application Dec. 12, 1975, Ser. No. 640,173

Int. Cl.² A21D *10/04*

U.S. Cl. 426—331 **9 Claims**

1. A method for preparing a storage stable culinary product comprising the steps of

a. forming an aqueous unleavened batter,

b. adding to said batter a sufficient amount of an edible acid so as to lower the pH thereof to below about 5, and

c. adding to said batter an edible alkaline leavening agent encapsulated in a normally water-insoluble, edible material, said alkaline leavening agent in a quantity sufficient to raise said pH to a level in the range of approximately 6 to 7, whereby said acid inhibits bacterial growth for preservation of said batter and is isolated from said leavening agent by said encapsulation.

4,022,918

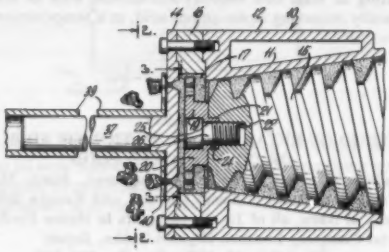
METHOD FOR PRODUCING IRREGULARLY SHAPED EXPANDED FOOD PRODUCTS

Robert C. Miller, Ringwood, N.J., assignor to Nabisco, Inc., East Hanover, N.J.

Continuation of Ser. No. 511,231, Oct. 2, 1974, abandoned, which is a division of Ser. No. 357,799, May 7, 1973, Pat. No. 3,861,844. This application Mar. 31, 1976, Ser. No. 672,516

Int. Cl.² A21D *13/00*

U.S. Cl. 426—446 **3 Claims**



1. The method of producing an irregularly shaped expanded food product comprising the steps of:

a. moving a moist cooked dough of granular plant material under superatmospheric pressure in a stream toward an extrusion die orifice,

b. continually randomly interrupting the flow of the dough past a plane perpendicular to the stream by providing a continually changing set of flow paths at said plane which are of different sizes at any particular time and change positions with time to divide the stream in different ways at different times to produce a plurality of individual flow segments, said plane being located sufficiently close to said extrusion die orifice so that the dough after moving past said plane does not fully coalesce into a unified stream and reaches the die orifice as a plurality of flow segments retaining a degree of individual identity,

c. and moving the stream through the extrusion die to release the pressure on the dough whereby the flow segments expand semi-independently to form an irregularly shaped extrusion strand.

4,022,919

REMOVAL OF BITTER FLAVOR FROM PEA FLOUR

Frederick William Comer, Agincourt, Canada, assignor to The Griffith Laboratories, Limited, Scarborough, Canada

Continuation-in-part of Ser. No. 549,870, Feb. 14, 1975, abandoned. This application Nov. 3, 1975, Ser. No. 628,577

Int. Cl.² A23L *1/20*

U.S. Cl. 426—511 **7 Claims**

1. A method of removing bitter flavour and pea flavour from a pea flour for addition to food systems comprising the steps of contacting the flour with moist steam for a time duration sufficient only to debitter the pea flour and volatilize pea flavour components and then leading off the steam and volatilized pea flavour components before a substantial cooked pea flavour develops in the flour.

4,022,920

FLAVORING WITH AMADORI COMPOUNDS

Tamme Doornbos, Doetinchem, and Godefridus Antonius Maria van den Ouweland, Zevenaar, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed July 2, 1975, Ser. No. 592,489

Claims priority, application United Kingdom, July 2, 1974, 29306/74

Int. Cl.² A23L *1/226*

U.S. Cl. 426—533 9 Claims

1. A process for preparing a foodstuff having an improved flavor when heated to a temperature of at least about 90° C comprising admixing the foodstuff or at least one ingredient of the foodstuff with at least one Amadori rearrangement compound in an amount of from about 1 to about 500 parts per million calculated on the foodstuff in the ready-for comsumption form, said Amadori rearrangement compound having a melting point below about 170° C and being prepared by reacting at least one 6-deoxy-aldohexose with at least one naturally occurring alpha-amino acid, at a temperature below about 90° C.

4,022,921

METHOD OF RETARDING OXIDATION OF EDIBLE FAT OR OIL IN STORED FOOD

Sakuichi Sakakibara, Kobe; Ko Sugisawa, Nara; Masanori Yamamoto, Suita; Takashi Kimura, and Kazuya Sekiguchi, both of Nara, all of Japan, assignors to House Food Industrial Company Limited, Higashi-Osaka, Japan

Filed Oct. 27, 1976, Ser. No. 736,242

Int. Cl.² A23D *5/04*

U.S. Cl. 426—542 7 Claims

1. A method of retarding oxidation of edible fat and oil in stored food which comprises:

a. mixing said food containing said fat or oil with an amount of an antioxidant selected from the group consisting of young leaves of *Coriandrum sativum L.*, shoots of said Coriandrum, juice of said leaves and shoots, and extract of said leaves and shoots; and

b. storing said food,

1. the amount of said antioxidant being sufficient to retard oxidation of said fat or oil and to prevent the formation of the rancid taste characteristic of the oxidized fat or oil during said storing,

2. said food being stored for a period sufficient to cause perceptible rancidity of said fat or oil in the absence of said antioxidant.

4,022,922

METHOD AND APPARATUS FOR ASEPTIC BULK STORAGE OF APPLE SAUCE

Philip E. Nelson, West Lafayette, Ind., assignor to Purdue Research Foundation, West Lafayette, Ind.

Filed Sept. 22, 1975, Ser. No. 615,227

Int. Cl.² A23L *1/212*, *3/22*

U.S. Cl. 426—638 12 Claims

1. A method of aseptically storing apple sauce comprising:

a. peeling and coring raw apples;

b. comminuting said apples;

c. heating said apples in a closed heater free from contact with steam to a temperature of from approximately 190° F. to approximately 220° F. to blanch said apples;

d. deaerating said apples in a closed unit;

e. heating said apples in a second closed heater to a temperature of at least 180° F. and maintaining said apples at said temperature for a time sufficient to effect sterilization thereof;

f. cooling said apples in a third heat exchanger to a temperature below about 100° F.; and

g. aseptically storing said apple sauce in bulk.

4,022,923

FROZEN GARLIC AND METHOD OF PRODUCING THE SAME

Sonja Berger, 328 Claymore Blvd., Richmond Heights, Ohio 44143

Filed Aug. 7, 1975, Ser. No. 602,585

Int. Cl.² A23L *1/22*

U.S. Cl. 426—638 7 Claims

1. A flavor retaining stabilized frozen garlic product comprising garlic pulp, water and an emulsifying agent, said product containing 60 to 80% by weight of garlic pulp, 1 to 10% of a natural emulsifying agent, and 1 to 10% of water.

4,022,924

DRY ACIDULENTS

William Alexander Mitchell, Lincoln Park, N.J., and William Charles Seidel, Monsey, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 13, 1974, Ser. No. 469,158

Int. Cl.² A23L *2/00*, *1/226*

U.S. Cl. 426—650 11 Claims

1. A method of making a free-flowing dry acid powder composition containing up to about 30% acid which powder is stable at room temperature and has a reduced tendency to undergo the browning reaction, which method comprises the steps of:

a. selecting a carbohydrate from the group consisting of dextrins having a preponderance of oligomers and a DE of about 1 to about 15, hydrolyzed granule starches having a DE of less than about 1, gelatinized hydrolyzed granule starches having a DE of less than about 1 and combinations thereof; and

b. co-drying the carbohydrate with a liquid acid by drying wherein the temperature of the liquid acid and the carbohydrate does not exceed about 90° C.

4,022,925

PROCESS FOR COATING METAL SURFACES WITH SYNTHETIC RESINS

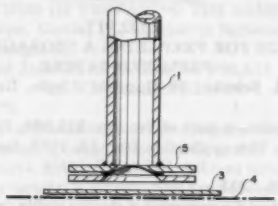
Franz Gottfried Reuter, Lemfoerde, and Peter Holl, Tubingen, both of Germany, assignors to Polymer-Physik GmbH & Co. KG, Germany

Filed June 6, 1975, Ser. No. 584,291

Claims priority, application Germany, July 20, 1974, 2435061

Int. Cl.² B05D *3/06*

U.S. Cl. 427—35 9 Claims



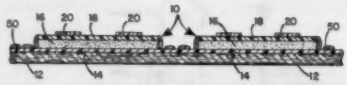
1. Process for coating a metal surface with a synthetic resin which comprises irradiating the metal surface prior to the application of the synthetic resin with high energy rays consisting essentially of electrons in the presence of a composition containing at least one organic compound or at least one organosilicon-oxygen compound, and subsequently coating the metal surface with the synthetic resin, and wherein said composition comprises normally gaseous hydrocarbons.

4,022,926

LABEL ASSEMBLIES WITHOUT DIE-CUTTING

Allen H. Keough, Sudbury, and Warren R. Pitts, Needham, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Aug. 27, 1976, Ser. No. 718,413
Int. Cl.² B32B 3/10, 27/16
U.S. Cl. 428—41 22 Claims



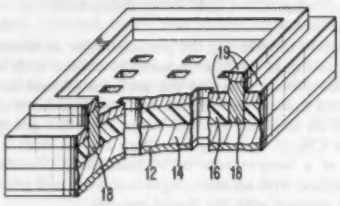
17. An assembly of laid-on labels comprising a temporary carrier web having a release surface, a plurality of discrete labels removably adhered to said release surface, each label comprising a pressure-sensitive adhesive in contact with said release surface and a continuous label base layer over said adhesive, said labels being spaced apart on said carrier in a predetermined pattern of label areas and intervening areas separating adjacent label areas, said label base layers comprising radiation polymerized polymers, and over said intervening areas of the carrier, discontinuous areas of radiation polymerized polymers identical in composition to said label base layers, said discontinuous areas of polymerized monomers being substantially unconnected to said continuous label base layers, said labels being individually removable from said carrier.

4,022,927

METHODS FOR FORMING THICK SELF-SUPPORTING MASKS

Aloysius T. Pfeiffer, Peekskill, and Lubomyr T. Romankiw, Briarcliff, both of N.Y., assignors to International Business Machines Corporation, Yorktown Heights, N.Y.

Filed June 30, 1975, Ser. No. 592,001
Int. Cl.² B05D 3/06
U.S. Cl. 427—43 44 Claims



1. A method of fabricating a self-supporting mask with aspect ratio>1 for increasing the strength of said mask and making it capable of being self-supported in which a relatively thin mask is supported on a substrate with an easily selectively removable layer lying between said substrate and said mask, both said layer and said substrate being transparent to selected radiation, said method including the steps of:

coating, to a desired thickness, the exposed surface of said mask with a material sensitive to said radiation,

exposing said mask to said selected radiation with said mask located with the substrate lying between said selected radiation and said material,

developing said material to remove selected areas of said material, and

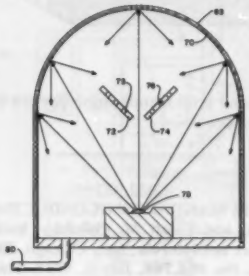
removing said easily selectively removable layer to lift said mask from said substrate thereby providing a self-supporting relatively thick mask.

4,022,928

VACUUM DEPOSITION METHODS AND MASKING STRUCTURE

Bernhard P. Piwcyzk, No. 6 Lismer Court, Kanata, Ontario, Canada (K2K 1A2)

Continuation-in-part of Ser. No. 580,023, May 22, 1975, abandoned. This application May 10, 1976, Ser. No. 684,563
Int. Cl.² B05D 3/06
U.S. Cl. 427—43 48 Claims



1. A method for inhibiting the deposition of a vapor stream of material onto surfaces within a vacuum, comprising applying a coating of perfluoropolyether onto surfaces upon which said deposition is to be inhibited.

4,022,929

METHOD OF ALUMINIZING THE INSIDE OF THE PANEL OF A TELEVISION PICTURE TUBE

Eberhard Nill, Esslingen (Neckar), and Peter Schmidt, Denkendorf, both of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,098
Claims priority, application Germany, Oct. 25, 1974, 2450834
Int. Cl.² H01J 29/28; C23C 13/02
U.S. Cl. 427—69 6 Claims

1. In a method of aluminizing the inside of the panel of a television picture tube wherein a lacquer forms an intermediate layer between the layer of fluorescent material and the layer of aluminum as applied thereafter by way of evaporation, the steps of applying the coat of lacquer drying said coat of lacquer and roughening said coat of lacquer onto the layer of fluorescent material, at least within the area of the lateral surfaces of the panel sufficiently to prevent the formation of blisters in the subsequently applied layer of aluminum caused by vaporization of said coat of lacquer when subsequently heated.

4,022,930

MULTILEVEL METALLIZATION FOR INTEGRATED CIRCUITS

David Bruce Fraser, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

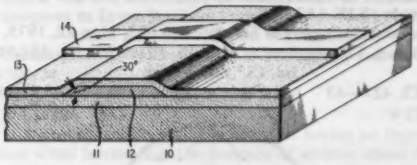
Filed May 30, 1975, Ser. No. 582,142
Int. Cl.² B05D 5/12
U.S. Cl. 427—86 4 Claims

1. A method for producing multilevel metallization on a semiconductor substrate comprising,

forming an insulating layer on the semiconductor wafer,

forming an Al, Si or Al—Si metal layer over the insulating layer by depositing the metal while simultaneously decreasing the temperature of the semiconductor wafer, applying an etch resist pattern to the metal layer, and chemically etching away the regions of the metal layer exposed through the etch resist pattern to form a first level metallization pattern having beveled edges,

forming a second insulating layer over the first level metallization pattern,



forming a second level metallization pattern on the second insulating layer.

4,022,931

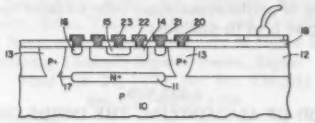
PROCESS FOR MAKING SEMICONDUCTOR DEVICE

James R. Black, and Elliott M. Philofsky, both of Phoenix, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 484,748, July 1, 1974. This application June 13, 1975, Ser. No. 586,700

Int. Cl.² H01L *21/316*

U.S. Cl. 427—91 **1 Claim**



1. A process of manufacturing a semiconductor comprising providing a semiconductor substrate with an insulative layer;

opening a window in said insulative layer to expose said semiconductor substrate; and

depositing beryllium on said insulative layer and said substrate at a temperature between 300° C and 400° C to form an ohmic contact with the substrate.

4,022,932

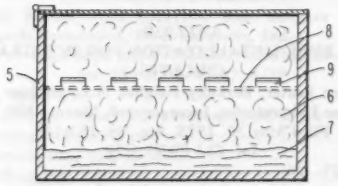
RESIST REFLOW METHOD FOR MAKING SUBMICRON PATTERNED RESIST MASKS

Bai Cwo Feng, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 9, 1975, Ser. No. 584,789

Int. Cl.² B05D *3/04*, *3/12*

U.S. Cl. 427—93 **7 Claims**



1. The method for making patterned resist masks comprising:

forming on a substrate surface a patterned resist mask having windows exposing planar surface regions of said substrate, and

flowing said resist mask by exposing said resist mask and substrate to a vapor of a solvent of said resist mask to reduce the area of each of said windows.

4,022,933

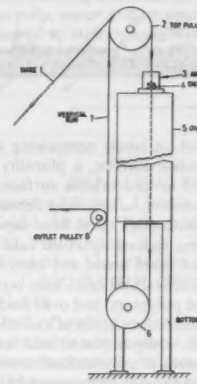
WIRE ENAMELLING MACHINERY AND THE USE THEREOF

John Derek Lee, St. Helens, England, assignor to BICC Ltd., London, England

Filed Aug. 22, 1975, Ser. No. 606,974

Int. Cl.² B05D *5/12*, *3/12*, *3/02*

U.S. Cl. 427—117 **18 Claims**



1. A wire enamelling machine comprising an oven, an applicator comprising at least one applicator unit mounted at the top end of the oven and forming part of a closure for the top end of the baking chamber of the oven, and means for passing the wire at least once downwardly through the applicator unit and the oven.

4,022,934

MEANS FOR INDUCING PERPENDICULAR ALIGNMENT OF A NEMATIC LIQUID CRYSTAL ON A COATED SUBSTRATE

Leroy J. Miller, Canoga Park, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 21, 1975, Ser. No. 570,305

Int. Cl.² C09K *3/34*; B05D *3/10*

U.S. Cl. 427—126 **8 Claims**

1. A method of inducing the perpendicular or homeotropic alignment of liquid crystals on surfaces coated with an oxide of silica comprising cleaning the surfaces of said device via conventional means, treating the surface of said device with a mixture of an aliphatic alcohol taken from the group whose formula is $CH_3(CH_2)_nCH_2OH$ where n is at least 2 and an amine at at a temperature of at least 60° C, washing said treated surface with an inert organic solvent and placing said surface in contact with the liquid crystals.

4,022,935

METHOD OF SPRAYING SEALING COMPOSITION TO INTERIOR WALLS OF STORAGE TANK

Paul W. Kinney, 1207 Evergreen Drive, Somerville, N.J. 08876, and Carl Walter Kirk, 17 Jessica Lane, Warren, N.J. 07060

Filed Mar. 12, 1975, Ser. No. 557,896

Int. Cl.² B32B *35/00*

U.S. Cl. 427—140 **5 Claims**

1. A method of sealing leaks in a storage tank having walls defining an enclosed interior and connected to a fill pipe through which a liquid is admitted to said interior for storage and comprising the steps of

emptying said tank interior of stored liquid,

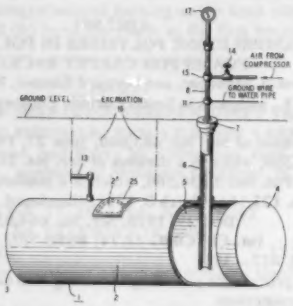
admitting a supply of air through said fill pipe for purging any stored liquid residue within said tank interior,

determining a safety level of said tank interior through said fill pipe,

opening an access port from an exterior to said interior of said tank through said walls,

removing residual liquid material from said tank interior.

establishing sealant composition adherent surfaces on said walls within said tank interior, and



spraying a sealant composition of thixotropic polyester resin and said sealant composition comprises a base resin of neopentyl glycol isophthalic acid corrosion resistant polyester resin, styrene and fumed silica and cobalt octoate, copper naphthenate and lithium chloride, to said adherent surfaces.

4,022,936

RECORD MATERIAL

Robert E. Miller, and Bruce W. Brockett, both of Appleton, Wis., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 28, 1975, Ser. No. 570,051
Int. Cl. B41m *5/00*
U.S. Cl. 427—151 **4 Claims**

1. A process for manufacturing a sensitized record material comprising the steps of

a. providing a substrate sheet material;

b. coating the substrate with an aqueous coating composition comprising 3,5-substituted salicylic acid, zinc compound selected from zinc oxide, zinc carbonate, zinc phosphate, and zinc phenol sulfonate, and ammonium hydroxide, wherein the 3,5-substituted salicylic acid and the zinc compound are present in a weight ratio of about 1:1 to 1:6 and the ammonium hydroxide is present in an amount to maintain the pH of composition at about 7.5 to 10.0; and

c. drying the coating composition.

4,022,937

METHOD FOR DEPOSITING POWDER WITHIN CARBONACEOUS ARTICLE

Albert Bennett, Lewiston, and Glenn R. Marin, Ransomville, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Division of Ser. No. 374,741, June 28, 1973, Pat. No. 3,903,838. This application June 23, 1975, Ser. No. 589,103
Int. Cl.² B05D *1/12*
U.S. Cl. 427—180 **3 Claims**

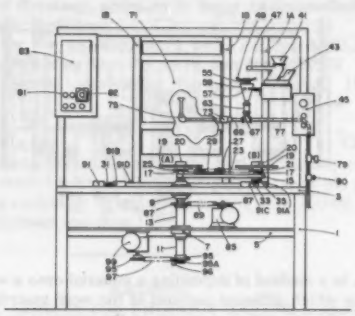
1. A method for applying finely divided solid additive to the surfaces of carbon cloth layer components of a carbonaceous article, comprising:

a. supporting two circular platens in spaced relationship to each other on a flat movable transfer arm, the platens having center supports for the alignment of circular layers of carbon cloth placed thereon;

b. moving the transfer arm in back and forth movement about a first vertical pivot and a curved track in the flat surface, to alternately position each platen beneath the dispersion chamber;

c. rotating each platen through a limited degree of rotation as the platen is positioned beneath the chamber, each platen rotating upon a second vertical pivot attached to the transfer arm;

d. charging a measured amount of additive to the blowing tube, the additive charge being blown into and dispersed within the dispersion chamber by a stream of gas admitted to the tube, the end of the tube within the dispersion chamber being directed toward the closed end of the chamber, the additive then falling in a uniform layer upon a carbon cloth layer held on the platen; and



e. causing a subsequent movement of the transfer arm to carry the platen with the coated carbon cloth layer into a position for manual addition of another disc, the same movement positioning the other platen and disc beneath the dispersion chamber.

4,022,938

FABRIC TREATMENT COMPOSITIONS

Wahib Nassif Zaki, Brussels, Belgium, and Alan Pearce Murphy, Colerain Township, Hamilton County, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 461,312, April 16, 1974, abandoned. This application Jan. 23, 1975, Ser. No. 543,607
Int. Cl.² D06M *13/46, 13/20*
U.S. Cl. 427—242 **22 Claims**

1. An article of manufacture adapted for providing fabric softening within an automatic laundry dryer, said article comprising:

a. a fabric softening amount of a softening composition having a melting point above about 38° C and being flowable at dryer operating temperatures, said composition comprising:

i. from about 50% to 92% by weight of the composition of a cationic fabric softener material; and

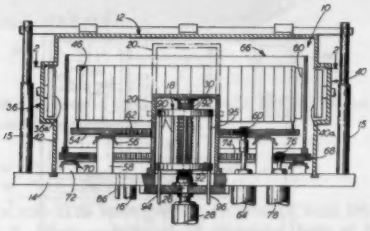
ii. from about 8 up to 50% by weight of the composition of a fatty alkyl sorbitan ester component selected from the group consisting of C_{10} to C_{26} fatty esters of sorbitan and ethoxylates of said esters wherein one or more of the unesterified —OH groups in said esters contain from 1 to about 20 oxyethylene moieties; the weight ratio of cationic fabric softener material to sorbitan ester component being greater than 1:1; and

b. a dispensing means which provides for release of said softening composition within an automatic laundry dryer at dryer operating temperatures, wherein when said dispensing means is a flexible substrate in sheet configuration the fabric softener is releasably affixed to said substrate to provide a weight ratio of softening composition to dry substrate ranging from about 10:1 to 0.5:1.

4,022,939
SYNCHRONOUS SHIELDING IN VACUUM DEPOSITION SYSTEM

Marvin E. Roth, and Donald J. Vallere, both of Reading, Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,043
Int. Cl.² C23C *13/02*
U.S. Cl. 427—251 **1 Claim**



1. In a method of depositing a material onto a work assembly in which different portions of the work assembly are successively exposed to a source of the material by moving the work assembly past a shutter opening in alignment with said source, the improvement comprising:

initiating emission of said material from said source in directions towards said work assembly while said shutter opening is disposed out of of alignment with said source, said shutter thus shielding said work assembly from said source;

synchronously advancing said opening, and a particular portion of said work assembly in alignment with said opening, into the path of material from said source until said opening is in fully aligned relation with said source;

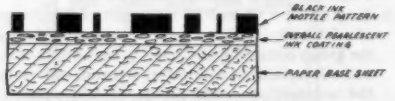
while said opening is maintained in said aligned relation, continuing movement of said work assembly past said opening to expose successive portions of said work assembly to said source; and

when the trailing edge of the last portion of said work assembly to be exposed to said source reaches the near edge of said opening, again synchronously advancing said shutter and said work assembly until said work assembly is fully shielded from said source by said shutter.

4,022,940
METHOD OF PRINTING A PAPER TO SIMULATE THE APPEARANCE OF A FOAMED POLYPROPYLENE SHEET AND ARTICLE PRODUCED THEREBY

Michael Arthur Schmelzer, Neenah; Ronald Eugene Wenzel, and Robert John Weyenberg, both of Appleton all of Wis., assignors to American Can Company, Greenwich, Conn.

Filed Nov. 3, 1975, Ser. No. 628,500
Int. Cl.² B05D *5/06*; B32B *29/06*
U.S. Cl. 527—262 **5 Claims**



1. A method for simulating the appearance of a foamed polypropylene sheet material, comprising applying on the surface of a substantially white printing grade paper having an optical density of less than 0.12 as measured by a reflectance densitometer calibrated on a scale ranging from 0. to 2.0 from dead white to dense black, respectively, an overall coating of a pearlescent ink to form a pearlescent coated surface having an optical density of between about 0.10 and 0.20 and subsequently overprinting between about 30 and 75 percent of said pearlescent surface with an ink of substantially dark hue in a mottled pattern of irregular elements, the individual elements of said pattern varying in size from about 0.2 to about 1.5 mm. in their greatest dimension, the mottled overprint being applied in an amount sufficient to increase the optical density of the overprinted surface by from 0.01 to 0.07 over the optical density of the pearlescent ink coated surface.

4,022,941
ORGANOSILICONE POLYMERS IN POLYURETHANE FOAMS FOR CARPET BACKING

Bela Prokai, Mahopac, and Bernard Kanner, West Nyack, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 483,660, June 27, 1974, Pat. No. 3,947,386, which is a division of Ser. No. 212,729, Dec. 27, 1971, Pat. No. 3,836,560, which is a continuation-in-part of Ser. No. 122,164, March 8, 1971, abandoned. This application Dec. 29, 1975, Ser. No. 644,831
Int. Cl.² C08G *18/14*; B05D *7/02*, *7/24*
U.S. Cl. 427—358 **17 Claims**

1. A process for providing a backing on a carpeting material which comprises

I. applying a curable froth which is substantially structurally stable, but workable at ambient temperatures, to the back of a carpeting material, said froth comprising

a. an organic polyisocyanate;

b. an active hydrogen compound reactive with said polyisocyanate to form a polyurethane;

c. a high molecular weight linear siloxane-polyoxyalkylene block copolymer selected from the class consisting of

i. Hydrolyzable $(AB)_n$ block copolymers having the average formula

$$[(R_2SiO)_x(C_nH_{2n}O)_y]_d$$

wherein R represents a monovalent hydrocarbon radical free from aliphatic unsaturation; n is an integer of 2 to 4 inclusive; x is an integer of at least 7; y is an integer of at least 4; d is an integer of at least 4; the average molecular weight of each siloxane block ranges from about 500 to about 10,000; the average molecular weight of each polyoxyalkylene block ranges from about 300 to about 10,000; the siloxane blocks constitute from about 20 to about 50 weight percent of the copolymer; the polyoxyalkylene blocks constitute about 80 to about 50 weight percent of the copolymer; and the block copolymer has an average molecular weight of at least about 65,000; and

ii. Non-hydrolyzable $(AB)_n$ block copolymers having the average formula

$$(-Y(R_2SiO)_aR_2SiYO][C_nH_{2n}O)_y-)_d$$

wherein R, n, y and d are the same as defined above; wherein a is an integer of at least 6; wherein y represents a divalent organic group attached to the adjacent silicon atom by a carbon to silicon bond and to the polyoxyalkylene block by an oxygen atom; wherein the average molecular weight of each siloxane block ranges from about 500 to about 10,000; wherein the average molecular weight of each polyoxyalkylene block ranges from about 300 to about 10,000; wherein the siloxane blocks constitute about 20 to about 50 weight percent of the copolymer; wherein the polyoxyalkylene blocks constitute about 80 to about 50 weight percent of the copolymer; and wherein the block copolymer has an average molecular weight of at least about 30,000; and

d. an inert normally gaseous gas substantially uniformly dispersed throughout said froth;

II. shaping said froth into a desired shape; and

III. maintaining the resultant shaped froth at a temperature sufficient to cure it and set its shape so as to form a cured polyurethane foam backing on said carpeting material.

16. A process for providing a second backing on a carpeting material composed of a first backing having a front side faced

with fibers which pass through the first backing and which extend beyond the back side to the first backing to mechanically anchor the fibers to the first backing which process comprises applying to (a) the back side of the first backing and (b) to the portion of the fibers extending beyond said back side, a substantially uniformly thick layer of a froth as defined in claim 1, shaping said froth into a desired shape, and maintaining said layer of froth at a temperature sufficient to (a) form a cured polyurethane foam of substantially uniform thickness as an integral second backing on the back side of the first backing and (b) bond the fibers to the first backing.

4,022,942

PROCESS OF PREPARING FIBROUS SHEET FROM HIGH-ORTHO PHENOLIC RESOLE RESIN VARNISH

George J. Anderson, and Harry M. Culbertson, both of Wilbraham, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 17, 1972, Ser. No. 227,262
Int. Cl.² C09J *3/14, 5/06*
U.S. Cl. 427—382 **13 Claims**

1. A process for preparing a resin impregnated sheet which comprises:

A. preparing a resole resin by reacting a phenol selected from the group consisting of phenol, meta-substituted phenol and a mixture of phenol and at least one substituted phenol with formaldehyde in an aqueous reaction mixture containing at least 14 weight percent water under reflux at about 60° C. to 100° C. in the presence of a divalent electropositive metal ion and sufficient organic acid to maintain a pH in the range between about 4 and 7, and thereafter dehydrating the resulting aqueous emulsion to a water content of from about 0.5 to 15 weight percent,

B. dissolving the resole resin in a volatile inert organic solvent to yield a solution of between 20 and 85 weight percent solids and a viscosity in the range of 5 to 500 centipoises,

C. impregnating a fibrous sheet substrate with the resole resin solution to provide a fibrous sheet substrate containing from about 15 to 70 weight percent of the resole resin,

D. drying the impregnated fibrous sheet substrate to reduce the volatile content, and

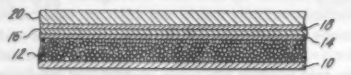
E. advancing the resin to the B-stage.

4,022,943

SHEET TYPE COVERING MATERIAL WITH METALLIC LUSTER AND PROCESS FOR MAKING SAME

Edward R. Erb, East Greenville, and Kenneth J. Faust, Orwigsburg, both of Pa., assignors to GAF Corporation, New York, N.Y.

Filed Aug. 5, 1976, Ser. No. 711,806
Int. Cl.² B32B *3/00, 3/26, 31/06*
U.S. Cl. 428—159 **21 Claims**



1. Decorative sheet type covering material comprising:

a. a substrate;

b. a foamed vinyl plastic layer adhered to said substrate;

c. an unfoamed smooth plastic layer of cured PVC plastisol or organosol adhered to said foamed layer;

d. a metal layer adhered to said smooth layer; and

e. a wear layer comprising cured polyurethane or cured PVC plastisol or organosol over said metal layer.

3. Material according to claim 1 in which the metal layer is discontinuous.

5. Material according to claim 3 in which the completed product is mechanically embossed.

4,022,944

NON-POROUS POLYCARBONATE FILMS LESS THAN 1 μM THICK

Ludwig Bottenbruch; Günther Kämpf, both of Krefeld-Bockum; Volker Serini, and Hugo Vernaleken, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 402,430, Oct. 1, 1973, Pat. No. 3,975,225. This application Mar. 15, 1976, Ser. No. 666,558
Claims priority, application Germany, Oct. 5, 1972, 2248818
Int. Cl.² B32B *31/04;* **B29D** *7/06*
U.S. Cl. 428—220 **1 Claim**

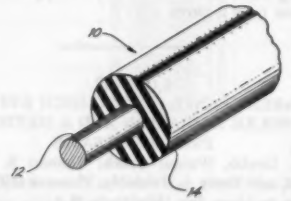
1. Non-porous polycarbonate films based on aromatic polycarbonates from 2,2-bis-(3,5-dimethyl-4-hydroxyphenyl)-propane having molecular weights, M_w, greater than 20,000 and having thicknesses less than 1 μm.

4,022,945

ELECTRIC CONDUCTOR PRODUCT HAVING A FLAME RESISTANT INSULATION

Burton Thornley MacKenzie, Jr., Monroe, and Sidney Rothenberg, Fairfield, both of Conn., assignors to General Electric Company, New York, N.Y.

Continuation-in-part of Ser. No. 400,830, Sept. 26, 1973, Pat. No. 3,908,068. This application June 9, 1975, Ser. No. 585,069
Int. Cl.² 252 *8.1;* **B32B** *15/00;* **C08K** *5/00;* **H01B** *7/00*
U.S. Cl. 428—389 **10 Claims**



1. An electrical conductor having a flame resistant insulation thereabout, comprising a metallic conductor and an insulating composition comprising a polymeric polyolefin containing a combination of at least one brominecontaining hydrocarbon selected from the group consisting of hexabromobiphenyl, decabromobiphenyl and decabromobiphenyl oxide in an amount of about 8 to about 50 percent by weight of bromine based upon the organic content of the insulating composition with an oxide of iron in an amount of about 3 to about 15 percent by weight of the organic content of the insulation composition.

4,022,946

METHOD FOR COATING WET SURFACES OR SURFACES IMMERSED IN WATER

Lowell O. Cummings, San Anselmo, Calif., assignor to PVO International Inc., San Francisco, Calif.

Continuation of Ser. No. 408,454, Oct. 23, 1973, abandoned, which is a division of Ser. No. 196,778, Nov. 8, 1971, which is a continuation-in-part of Ser. No. 157,638, June 28, 1971, abandoned. This application Nov. 20, 1975, Ser. No. 633,864
Int. Cl.² B05D *7/14, 7/24*
U.S. Cl. 428—413 **14 Claims**

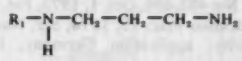
1. A method of coating a substrate with a wet or moist surface including a surface immersed under water, comprising the steps of:

a. thoroughly mixing, to provide a non-aqueous coating composition:

A. an epoxy resin consisting of a polyepoxide having a plurality of vic-epoxy groups and containing only members of the group consisting of carbon, hydrogen, oxygen and chlorine, and

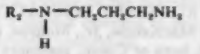
B. a stoichiometric amount of an amine curing agent which is substantially insoluble in water and not water-sensitive and chosen from the group consisting of

1. an amine of the formula



where R_1 is chosen from the group consisting of ether radicals of which one of the alkyl or alkylene radicals has at least eight carbon atoms, and

2. a condensation product of a small proportion of a polyepoxide having a plurality of vic-epoxy groups and containing only members of the group consisting of C, H, O, and Cl, and a large proportion of a fatty amine of the formula:



where R_2 is chosen from the group consisting of alkyl radicals having at least eight carbon atoms and ether radicals of which one of the alkyl or alkylene radicals has at least eight carbon atoms,

b. applying said coating composition to said surface, and

c. leaving alone said surface with the applied coating composition until it cures.

4,022,947

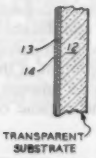
TRANSPARENT PANEL HAVING HIGH REFLECTIVITY FOR SOLAR RADIATION AND A METHOD FOR PREPARING SAME

Albany D. Grubb, Walnut Creek; Thomas S. Mosakowski, Concord, and Terry A. Trumbly, Pleasant Hill, all of Calif., assignors to Airco, Inc., Montvale, N.J.

Filed Nov. 6, 1975, Ser. No. 629,459

Int. Cl.² G02B *1/12;* **C03C** *17/06;* **B32B** *17/06, 15/04*

U.S. Cl. 428—432 **15 Claims**



1. A transparent article having a high reflectance for solar radiation, comprising:

a transparent substrate;

a metal film wherein the metal elements comprise 0.5 to 81 weight percent iron, 3 to 85 percent nickel and 14 to 26 percent chromium; and

a metal oxide film wherein the metal radicals comprise 0.5 to 81 percent iron, 3 to 85 percent nickel, and 14 to 26 percent chromium.

15. A method of rejecting solar energy while admitting visible radiation to a structure having an opening, comprising:

covering the opening with a transparent panel according to claim 1.

4,022,948

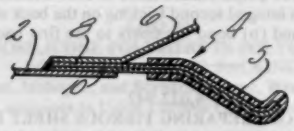
RESILIENTLY COATED METALLIC FINGER SEALS

William E. Smith, and Roy G. Nelson, both of Lake Park, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 23, 1974, Ser. No. 535,645

Int. Cl.² B32B *9/04*

U.S. Cl. 428—542 **2 Claims**



1. A seal means for use between a stationary member and a movable member, said seal comprising two overlapping metallic members each having a solid portion at one end and having slots forming fingers at the other end, said slots of each metallic member being offset so they are not aligned, silicone rubber encapsulating said fingers to a point adjacent the closed ends of the slots exposing the ends of the slots, said silicone rubber filling the exposed ends of the slots to the tops of the slots, the solid ends of the members being contoured to fit the stationary member, the end of the members having the fingers being shaped to fit the movable member.

4,022,949

AIR-DEPOLARIZED CELL

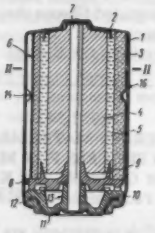
Faat Khatovich Nabiullin, 3 Mytischinskaya ulitsa, 14a, kv. 90, Moscow, U.S.S.R.

Filed Dec. 17, 1975, Ser. No. 641,577

Claims priority, application U.S.S.R., Dec. 24, 1974, 2082914

Int. Cl.² H01M *8/02*

U.S. Cl. 429—28 **3 Claims**

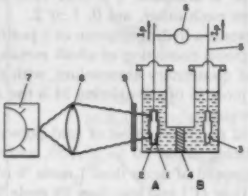


1. An air-depolarization cell comprising: a casing with a bottom; a first insulating gasket placed on said bottom of said casing; a hollow open-ended corrugated perforated lead-out positioned coaxially inside and adjacent said casing; a positive electrode mass pressed on the inner surface of said corrugated perforated lead-out; a negative electrode coaxially arranged within said positive electrode on said first insulating gasket; an ion-conducting membrane coaxially positioned between said positive and negative electrodes; a lead-out of said negative electrode positioned in the center of said negative electrode; a bushing slipped on said lead-out of said negative electrode; an annular projection on said bushing inserted into the material of said ion-conducting membrane; a metal lid contacting said lead-out of said negative electrode and having holes providing access of air to said positive electrode; a second insulating gasket positioned around the edge of and under said metal lid; and a sealing coupling made integral with said second insulating gasket and fitted on said lead-out of said negative electrode.

4,022,950
REVERSIBLE PHOTOGALVANIC CELLS FOR THE CONVERSION OF SOLAR RADIATION INTO ELECTRICITY

Francis K. Fong, and Nicholas Winograd, both of Lafayette, Ind., assignors to Purdue Research Foundation, Lafayette, Ind.

Filed Jan. 14, 1976, Ser. No. 649,090
Int. Cl.² H01M 6/30
U.S. Cl. 429—105 **14 Claims**



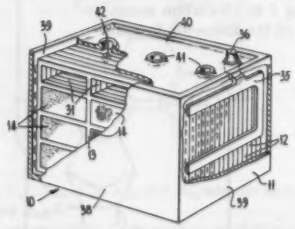
1. A photogalvanic cell comprised of:
a first half cell having a first electrode suspended therein;
a first solution contained in said first half cell with said solution comprising an ionic salt dissolved therein;
a chlorophyll a coating on the electrode suspended in said first half cell;
a second half cell having a second electrode suspended therein;
a reversible electron acceptor solution contained in said second half cell;
charge flow control means adapted to permit cation charge flow from one cell to the other between said first and second half cells with at least a portion of the respective solutions contained in said half cells being in contact with said flow control means whereby upon light irradiation of said first electrode and an electrical interconnection between said first and second electrodes, electrons flow therebetween and cation charge flows through said flow control means and whereby the absence of light causes a reversal of electron flow between the electrode and of cation charge flow through said flow control means.

6. The photogalvanic cell according to claim 1 in which said reversible electron acceptor solution is comprised of hydroquinone.

4,022,951
BATTERY CONSTRUCTION

William Leslie McDowall, North Clayton, Australia, assignor to Dunlop Australia Limited, Melbourne, Australia

Continuation-in-part of Ser. No. 399,778, Sept. 20, 1973, Pat. No. 3,941,615. This application Nov. 24, 1975, Ser. No. 634,699
Claims priority, application Australia, Nov. 25, 1974, 9738/74
Int. Cl.² H01M 10/04
U.S. Cl. 429—149 **10 Claims**

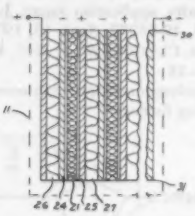


1. A multi-cell battery including a plurality of frames formed of a mouldable material which is electrically insulating at the intended operating voltage of the battery and is inert to the active materials of the battery and any material produced during operation of the battery, each frame defining a plurality of separate material receiving areas in side by side relationship across the width of the frame, each frame including portions forming divisions between adjacent support areas of the frame, the frames being arranged in a side by side relationship in a direction normal to the width of the frame with the portions of each frame forming the divisions between adjacent receiving areas secured in a sealed relationship to the corresponding portions in adjacent frames to form partitions between adjacent cells of the battery, and electrolyte porous separator member located between each two adjacent frames in the assembly of frames spanning each support area thereof and sealed to the portions of the frame defining said support area, and individual masses of active battery material support in each area of each frame so that each area forms a plate of the battery, the active battery material in respective areas being selected so that adjacent areas in each frame form plates of opposite polarity and adjacent areas in adjoining frames form plates of opposite polarity.

4,022,952
ELECTRODE ASSEMBLY FOR BIPOLAR BATTERY

David H. Fritts, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 19, 1975, Ser. No. 642,524
Int. Cl.² H01M 6/48
U.S. Cl. 429—210 **2 Claims**



1. The improvement in a bipolar electrode having silver oxide positive active material and zinc negative active material for a pile type AgO-Zn-KOH bipolar battery, the said electrode improvement comprising:
a. a porous silver sheet;
b. a grid layer of silver metal attached in sealing relationship to each surface of the said porous sheet;
c. beeswax;
d. means for filling the said porous sheet with the said beeswax;
e. means for applying the said positive active material to one grid layer; and
f. means for applying the said negative active material to the other said grid layer.

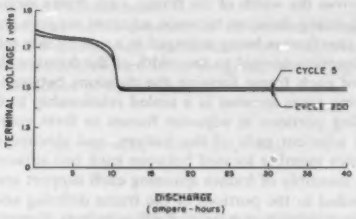
4,022,953
ZINC ELECTRODES FOR SECONDARY BATTERIES

Allen Charkey, Brookfield, Conn., assignor to Energy Research Corporation, Danbury, Conn.

Filed Aug. 22, 1975, Ser. No. 606,866
Int. Cl.² H01M 4/42
U.S. Cl. 429—229 **13 Claims**

1. Zinc electrode structure comprising an electrically conductive support and zinc active material and including cadmium particulate matter dispersed in said zinc active material, said cadmium particulate matter being selected from the group consisting of (a) metallic cadmium having particle size of not greater than 10 microns and surface area not less than 1.0 square meters per gram, (b) a cadmium compound elec-

trochemically convertible to metallic cadmium having particle size of not greater than 10 microns and surface area not less than 1.0 square meters per gram and (c) mixtures of said



metallic cadmium and said cadmium compound, the weight of said cadmium particulate matter being from 1.0 to 10% of the weight of said zinc active material.

4,022,954

NOVEL POLYMER CONTAINING CYCLOPENTANYLVINYLENE UNITS

Shigeru Kurosawa; Takashi Ueshima, both of Yokohama; Yasuzi Tanaka, Kawasaki, and Shoichi Kobayashi, Yokohama, all of Japan, assignors to Showa Denko Kabushiki Kaisha, Japan

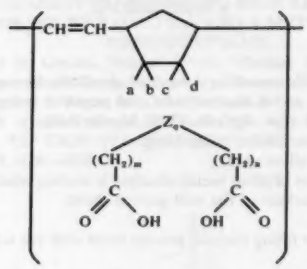
Filed July 1, 1975, Ser. No. 592,320

Claims priority, application Japan, July 4, 1974, 49-75903; July 26, 1974, 49-85072; Sept. 13, 1974, 49-104849

Int. Cl.² C08F *8/12, 8/42, 8/46, 22/04*

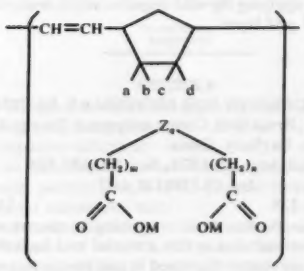
U.S. Cl. 526—15 **13 Claims**

1. A homopolymer or copolymer comprising recurring units of the following formula



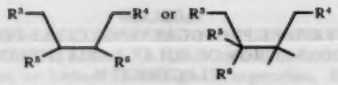
(I)

or



(I')

wherein Z is bonded to a carbon of a five-membered ring by any two of bonds *a* to *d*, the remaining two bonds being filled by R^1 and R^2, and Z represents

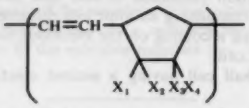


R^1 to R^6, independently from each other, represent a hydrogen atom or an alkyl group containing 1 to 6 carbon atoms; and endomethylene linkage can exist between the carbon atom to which R^2 is attached and the carbon atom to which R^4 is attached; *q* is 0 or 1; *m* and *n*, independently from each other, are 0, 1 or 2.

and M represents a hydrogen atom or a positive ion selected from the group consisting of alkali metals, alkaline earth metals and quaternary ammonium, with the proviso that at least 1 mole % of the existing M is the above ion other than hydrogen;

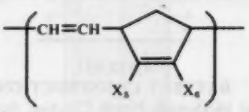
the degree of polymerization of said homopolymer or copolymer being about 10 to 10,000; and said copolymer being composed of more than 1 mole % of the unit of the formula (I) or (I') and less than 99 mole % of one biradical unit selected from the following groups:

a. units of the following formula



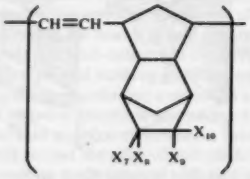
wherein X_1, X_2, X_3 and X_4, independently from each other, represent a hydrogen atom, a hydrocarbon radical containing 1 to 20 carbon atoms, polar group selected from the group consisting of cyano, ester, ether, halogen, amido and imido, or a hydrocarbon radical containing 1 to 20 carbon atoms and substituted by one said polar group, with the proviso that at least one of X_1, X_2, X_3 and X_4 is the polar group, the hydrocarbon substituted by the polar group, or an aryl radical group containing 6 to 20 carbon atoms;

b. units of the following formula



wherein X_5 and X_6, independently from each other, represent a hydrogen atom, a hydrocarbon radical containing 1 to 10 carbon atoms, an ester radical, or a hydrocarbon radical containing 1 to 10 carbon atoms substituted by an ester radical, and at least one of X_5 and X_6 is the ester radical or the ester-substituted hydrocarbon radical containing 1 to 10 carbon atoms;

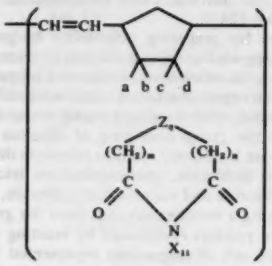
c. units of the following formula



wherein X_7, X_8, X_9 and X_{10}, independently from each other,

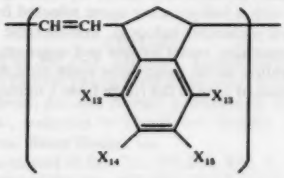
represent a hydrocarbon radical containing 1 to 20 carbon atoms, and at least one of X_7, X_8, X_9 and X_{10} is an aryl or alkaryl radical containing 6 to 20 carbon atoms;

d. units of the following formula



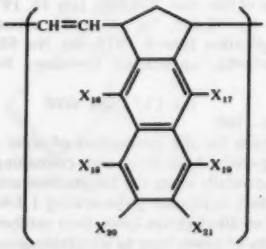
wherein X_{11} represents a hydrocarbon radical containing 1 to 10 carbon atoms or an ester group-containing radical containing 3 to 21 carbon atoms, and Z, *q*, *m* and *n* are the same as defined above;

e. units of the following formula



wherein X_{12}, X_{13}, X_{14} and X_{15}, independently from each other, represent a hydrogen atom, a hydrocarbon radical containing 1 to 10 carbon atoms, a polar group selected from the group consisting of cyano, ester and halogen, or a hydrocarbon radical containing 1 to 10 carbon atoms and substituted by one said polar group;

e. units of the following formula



wherein X_{16}, X_{17}, X_{18}, X_{19}, X_{20} and X_{21} are the same as X_{12}, X_{13}, X_{14} and X_{15};

g. units of a monoolefinic hydrocarbon containing 4 to 20 carbon atoms; and

h. units of a non-conjugated diene group containing 6 to 20 carbon atoms.

4,022,955

THERMOSETTING COATING COMPOSITION COMPRISING A HYDROXY ACRYLATE ESTER COPOLYMER AND N-ACYLPOLYLACTAM OR N-ACYLPOLYIMIDE

Hiroshi Nishizawa, and Minoru Fuzishima, both of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

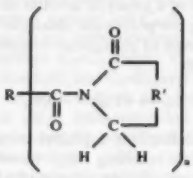
Filed July 1, 1975, Ser. No. 592,182

Claims priority, application Japan, July 3, 1974, 49-75287

Int. Cl.² C08F *120/00, 220/00, 8/32, 220/04*

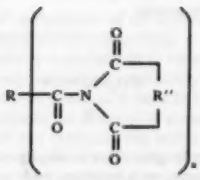
U.S. Cl. 526—16 **5 Claims**

1. A thermosetting coating composition comprising (A) 100 parts by weight of a copolymer obtained by copolymerizing (a) 5 to 40% by weight of at least one unsaturated compound containing a hydroxyl group selected from the group consisting of hydroxyalkyl acrylates, hydroxyalkyl methacrylates and acrylic and methacrylic esters of glycols, glycerine, trimethylol propane and pentaerythritol and (b) 60 and 95% by weight of an unsaturated compound copolymerizable with said compound (a) and being at least one member selected from the group consisting of styrene type monomers, alkyl acrylates, alkyl methacrylates, vinyl acetate, acrylonitrile and acrylamide, said copolymer (A) having a number average molecular weight of 2,000 to 150,000 and (B) 5 to 40 parts by weight of at least one member selected from the group consisting of an N-acylpolylactam compound represented by the general formula



wherein R is an alkylene group having 2 to 12 carbon atoms, which may include 1 to 2 nitrogen or oxygen atoms, or may contain locally an unsaturated linkage, a di- to tetravalent benzene nucleus, which may have a substituent on the benzene nucleus, or a di- to trivalent heterocyclic residue having 3 to 15 carbon atoms; R′ stands for an alkylene group having 1 to 11 carbon atoms; and *n* is an integer of 2 to 4,

an N-acylopolyimide compound represented by the general formula



wherein R and *n* are as defined above and R″ stands for an alkylene group having 1 to 11 carbon atoms or a divalent benzene nucleus, and

mixtures thereof.

4,022,956
POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS

John Alf Bergfjord, Macedon; Richard William Radler, Marion, and Richard Phillip Millonzi, Macedon, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

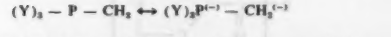
Division of Ser. No. 374,163, June 27, 1973, Pat. No. 3,896,184. This application Oct. 2, 1974, Ser. No. 511,133
Int. Cl.² C08F *112/32*
U.S. Cl. 526—75 6 Claims

1. A process for producing a polymeric material from a polycyclic aromatic reactant of the formula:

wherein Q is defined as a polycyclic aromatic group having at least 4 fused ring nuclei; by contacting the reactant with at least a molar amount of a haloalkyl ether of the formula:

wherein A is individually defined as an alkyl group; to obtain a corresponding polycyclic aldehyde intermediate represented by the formula:

in the presence of a catalytic amount of $SnCl_4$ or $TiCl_4$; and then reacting the polycyclic aldehyde intermediate with a reactive amount of phosphine compound represented by the formulae:



wherein Y is defined as a phenyl or an alkyl group; and contacting the resulting vinyl monomer in a reaction solvent with an initiating amount of a Lewis acid, this step being effected under vacuum in an essentially moisture-free environment.

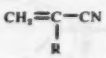
4,022,957
THERMOPLASTIC NITRILE RESINS

Russell K. Griffith, Chagrin Falls, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

Filed May 23, 1973, Ser. No. 363,011
Int. Cl.² C08F *36/06*
U.S. Cl. 526—87 7 Claims

1. The process for preparing a thermoplastic resin comprising polymerizing in an aqueous medium a mixture consisting of

A. from 85 to 98% by weight of at least one nitrile monomer having the structure



wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen, and

B. from 15 to 2% by weight of a conjugated diene monomer selected from the group consisting of butadiene and isoprene

in such a manner that some of (B) is always present during the entire course of the polymerization.

4,022,958
PROCESS FOR PREPARING POLYOLEFINS

Kazuo Matsuura, Kawasaki; Nobuyuki Kuroda, Yokohama; Toru Nakamura, Yokohama, and Mituji Miyoshi, Naka, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 454,142, March 22, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,442
Int. Cl.² C08F *4/02, 10/02*
U.S. Cl. 526—124 7 Claims

1. Process for preparing polyolefins by polymerizing or copolymerizing olefins using a catalyst prepared from a component with a transition metal compound supported on a solid carrier and an organoaluminum compound and/or an organozinc compound, said transition metal compound being selected from the group consisting of titanium tetrachloride, ethoxytitanium trichloride, diethoxytitanium dichloride, dibutoxytitanium dichloride, phenoxytitanium trichloride, vanadium tetrachloride and vanadium oxychloride, said solid carrier comprising a member selected from the group consisting of a reaction product A obtained by reacting (1) an organic dicarboxylate salt of magnesium represented by the general formula $Mg(OOCR)_2$ wherein R is an aliphatic, aromatic or alicyclic having 2 to 32 carbon atoms and (2) an aluminum compound selected from the group consisting of aluminum trimethoxide, aluminum triethoxide aluminum tri-n-propoxide, aluminum triisopropoxide, aluminum tri-n-butoxide, aluminum tri-sec-butoxide, aluminum tri-t-butoxide and aluminum triphenoxide, at a temperature in the range from 50° to 500° C. for a period of time in the range from 1 to 30 hours, the molar ratio of said aluminum compound to said organic dicarboxylate salt of magnesium ranging from 1.6:1 to 4:1, and a reaction product B obtained by treating said reaction product A with a halogenating agent selected from the group consisting of molecular halogens, non-metallic halides, non-metallic oxyhalides, metal halides and organometallic halides at a temperature in the range from room temperature to 400° C. for a period of time in the range from 1 minute to 24 hours.

4,022,959
ORGANOLITHIUM-LEWIS BASE POLYMERIZATION OF 1,3-BUTADIENE AND NOVEL POLYBUTADIENES THUS PRODUCED

Neithart Sommer, and Karl-Heinz Nordsiek, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Continuation of Ser. Nos. 378,010, July 10, 1973, abandoned, and Ser. No. 92,259, Nov. 23, 1970, abandoned. This application June 4, 1975, Ser. No. 583,839
Claims priority, application Germany, Nov. 22, 1969, 1958650
Int. Cl.² C08F *4/48*
U.S. Cl. 526—180 3 Claims

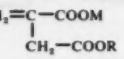
1. A process for the production of solid polybutadienes having long-chain branching and containing vinyl groups varying substantially along the longitudinal axis of the macromolecule which comprises polymerizing 1,3-butadiene in the presence of an alkyllithium-Lewis base catalyst system having a weight ratio of Lewis base to alkyllithium compound of 0.1 : 1 to 1,000 : 1 and the Lewis base is a monofunctional ether, a difunctional ether or a tertiary amine, in an inert diluent at a starting temperature of at least 60° C and with in increasing polymerization temperature substantially throughout the polymerization such that the temperature gradient through which the polymerizaton progresses is at least 50° C, and the reaction is conducted to a final temperature up to 155° C.

4,022,960
POLYMERS WITH HIGH TRANSPARENCY AND REFRACTIVE INDEX AND PROCESS FOR PRODUCTION THEREOF

Seiichi Mima, Toyonaka, and Masaru Miya, Ikeda, both of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 124,505, March 15, 1971, abandoned. This application Mar. 13, 1973, Ser. No. 340,715
Int. Cl.² C08F *222/02*
U.S. Cl. 526—240 **13 Claims**

1. A transparent crosslinked polymer having a high refractive index prepared from the monomer which comprises a metal salt of itaconic acid monoester, the said metal salt of itaconic acid monoester being represented by the generic formula:



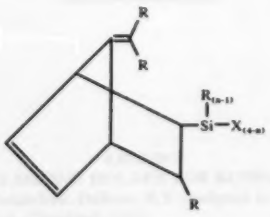
wherein, M is one member selected from the class consisting of Pb, Ba and La and R is one member selected from the class consisting of an alkyl group with 1 – 4 carbon atoms, an allyl group and a methallyl group.

4,022,961
FULVENE-SILANE ADDUCT AND ETHYLENE INTERPOLYMERS EMBODYING SAME

William C. Bond, Jr., and Harold J. Wahlborg, both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Continuation-in-part of Ser. No. 546,933, Feb. 4, 1975, which is a continuation of Ser. No. 320,482, Jan. 2, 1973, abandoned, which is a continuation of Ser. No. 112,068, Feb. 2, 1971, abandoned. This application Sept. 8, 1975, Ser. No. 610,988
Int. Cl.² C08F *15/40, 30/08, 130/08;* C07F *7/02*
U.S. Cl. 526—279 **16 Claims**

1. An interpolymer comprising the reaction product by addition polymerization with a Ziegler catalyst through unsaturated groups of (1) an adduct of the formula



where R is selected from the group consisting of hydrogen, C_1 to C_8 alkyl, halogen-substituted C_1 to C_8 alkyl, an unsaturated organic group having 1 to 8 carbon atoms and a norbornenyl group, X is a hydrolyzable group selected from the group consisting of a tertiary amino group and halogen, and n is a number from 1 to 3, (2) ethylene and (3) an unsaturated monomer selected from the group consisting of a monoolefin containing 3 to 20 carbon atoms, or a non-conjugated polyene in which the ethylene and monoolefin, when present, are present in the interpolymer in the weight ratio of 90–5 ethylene to 10–95 monoolefin, in which, when a polyene is present in the polymer, the polymer is chemically bound in the interpolymer in an amount to provide an interpolymer having an unsaturated level of at least 1.5 carbon to carbon double bonds per 1000 carbon atoms and the adduct is present in the interpolymer in an amount within the range of 1.0 to 20 percent by weight.

4,022,962
CARBAMYLGUANIDINE ANTIMICROBIAL COMPOUNDS

Julius Diamond, Morris Plains, N.J., assignor to Cooper Laboratories, Inc., Parsippany, N.J.

Filed Feb. 3, 1975, Ser. No. 546,549
Int. Cl.² C07C *59/17*
U.S. Cl. 536—18 **22 Claims**

1. A compound having the formula Z—B—Y—B—Z ·*n*HA wherein Y is a C_2–C_{12} alkylene, [C_5–C_{12} cycloalkylene, C_5–C_{12} cycloalkylenebis(loweralkyl), C_6–C_{12} arylene and loweralkylarylene, C_7–C_{12} arylenebis(loweralkyl), and C_8–C_{12} arylenebis(loweralkyl)]; B is a [substituted guandino] carbamylguanidino group [selected from the group consisting of carbamylguanidino and thiocarbamylguanidino]; [or biguanidino provided that B′ is biguanidino only when B is carbamylguanidino bonded to Y through the guanidino portion of the group]; and Z is selected from the group consisting of [C_1–C_{12} alkyl; C_4–C_{12} dialkylaminoalkyl; C_3–C_{12} alkenyl; C_3–C_{12} alkynyl; C_3–C_{12} cycloalkyl, C_4–C_{12} cycloalkylalkyl; C_1–C_{10} alkoxy C_{10}–C_2 alkyl having a total carbon content of C_3–C_{14}; C_1–C_{10} alkylthio C_{10}–C_2 alkyl having a total carbon content of C_3–C_{14}; phenoxy C_2–C_6 alkyl; phenylthio C_2–C_6 alkyl]; C_6–C_{14} aryl; [C_7–C_{14} aralkyl and arylcycloalkyl]; and C_6–C_{14} aryl [and aralkyl]]substituted with one or more radicals selected from the group consisting of lower alkyl, trifluoromethyl, loweralkoxy, trifluoromethyoxy, [phenoxy,] loweralkylthio, halo, [nitro, cyano, C_2–C_6 acyl, benzoyl, alkoxycarbonyl, diloweralkylamino,] and loweralkylsulfonyl, [fluorosulfonyl and alkylsulfinyl]; and pharmacologically acceptable addition salts of these compounds with acids represented by nHA wherein n=0, ½, ½, ⅔, 1, and 2 and HA is an inorganic or organic acid.

4,022,963
ACETYLATION PROCESS FOR NUCLEOSIDE COMPOUNDS

Daniel H. Deutsch, 141 Kenworthy Drive, Pasadena, Calif. 91105

Continuation-in-part of Ser. No. 261,026, June 8, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,152
Int. Cl.² C07H *19/08*
U.S. Cl. 536—23 **9 Claims**

1. A method of acetylation of all hydroxyl groups in the sugar portion of nucleosides comprising:

adding acetic acid to a nucleoside to be acetylated selected from the group consisting essentially of 6-azauridine, thymidine, uridine, and uracil beta-D-arabinofuranoside;

heating the mixture in the absence of pyridine and further in the absence of any catalyst until reflux begins;

adding an excess of acetic anhydride to the mixture;

continue heating the resulting mixture until acetylation of the hydroxyl groups on the sugar moiety is essentially complete; and

stripping acetic acid and any excess acetic anhydride off the mixture, and recovering the acetylated nucleoside product.

4,022,964

ION EXCHANGER ON THE BASIS OF CELLULOSE AND PROCESS FOR ITS MANUFACTURE

Karl Heinrich Lieser, Seeheim, and Peter Burba, Darmstadt, both of Germany, assignors to Riedel-de Haen Aktiengesellschaft, Seelze-Hannover, Germany

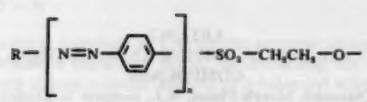
Filed July 30, 1975, Ser. No. 600,298

Claims priority, application Germany, Aug. 5, 1974, 2437594

Int. Cl.² C08B *11/00*

U.S. Cl. 536—43 6 Claims

1. An ion exchange cellulose derivative having groups of the formula



in which R is an ion exchange group and *n* is zero or 1.

4,022,965

PROCESS FOR PRODUCING REACTIVE, HOMOGENEOUS, SELF-BONDABLE LIGNOCELLULOSE FIBERS

David W. Goheen, Camas, Wash., and John S. Barton, Orinda, Calif., assignors to Crown Zellerbach Corporation, San Francisco, Calif.

Filed Jan. 13, 1975, Ser. No. 540,354

Int. Cl.² C08B *1/00;* D21B *1/04*

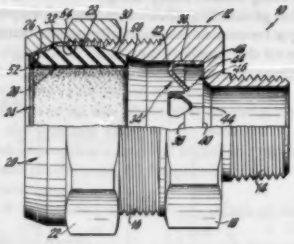
U.S. Cl. 536—56 29 Claims

1. A process for producing reactive, homogeneous, self-bondable, lignocellulosic fibers, capable of subsequently being bonded to form sheet products having improved wet- and dry-strength properties, which comprises subjecting individual, separate fibers of lignocellulose to a controled oxidative modification step, including a confrication step, which includes contacting said individual, separate fibers with an oxidative reagent system in an amount sufficient to effectively produce said reactive, homogeneous, self-bondable, lignocellulosic fibers.

4,022,966
GROUND CONNECTOR

Padej Gajajiva, Elmhurst, N.Y., assignor to I-T-E Imperial Corporation EFCOR Division, East Farmingdale, N.Y.

Filed June 16, 1976, Ser. No. 696,546
Int. Cl.² H02G *3/06*
U.S. Cl. 174—65 SS **10 Claims**



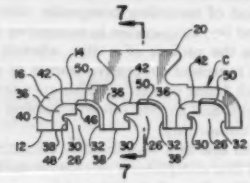
1. A grounding connector for coupling a jacketed, armored cable to a utilization device such as a junction box, said connector comprising the combination of a metallic body portion having first and second external threads at opposite ends thereof, respectively, for engagement by said first threads with the utilization device, a resilient grommet having at least a portion thereof positioned within said body portion and arranged to bear against an outside surface of the cable in an assembled condition, a compression nut arranged to mate with said second threads on said body portion to thereby exert a force on said grommet whereby said grommet is compressed between said body portion and the outside surface of the cable, and a metallic grounding ring disposed within said body portion, said grounding ring having at least a partially circumferential, axially extending side wall defined by first and second ends, said grounding ring further including at least one elongated finger integral with said grounding ring side wall proximate said first end thereof, one end of said finger pointing in a direction of the body portion end having said first threads, said direction being the direction of cable insertion, said side wall of said grounding ring being in contact with said body portion, whereby, in the assembled condition, said finger is in contact with the armor of the cable.

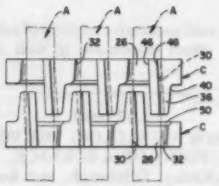
4,022,967
CLAMPING HOLDER FOR BUSBARS

William J. Bulanchuk, Pelham, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 635,943
Int. Cl.² H01B *17/06;* **B60M** *1/16;* **F16L** *3/02, 3/10*
U.S. Cl. 174—156 **8 Claims**

6. A clamping holder comprising; a base member having at least one projection, opening and clamping surfaces all positioned for cooperation with a reversely positioned identical base member by having the projection on each received in the opening of the other with the clamping surfaces in spaced-apart opposed relationship to define a part receiving aperture, said base member having a bottom portion and said opening being outwardly open of said bottom portion at a bottom opening, and said clamping surface comprising a longitudinally extending arcuate groove in said base member along one side of said opening spaced above said bottom opening.

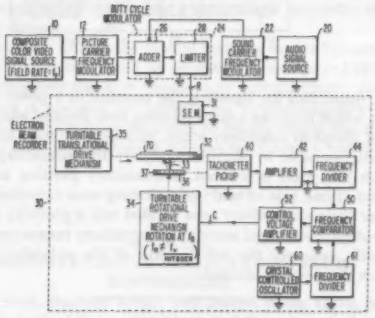




4,022,968
RECORDING APPARATUS AND METHODS FOR USE IN FORMING A VIDEO DISC RECORD HAVING SPIRALLY ALIGNED SYNC STORAGE LOCATIONS

Eugene Orville Keizer, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 522,820, Nov. 12, 1974. This application July 14, 1975, Ser. No. 595,807
Int. Cl.² H04N *5/76*
U.S. Cl. 358—128 **6 Claims**



1. In a system for recording information on a disc, said system including a source of composite video signals having given field and line repetition rates, apparatus comprising the combination of :

means responsive to composite video signals from said source for developing a recording signal;

means for exposing successive regions disposed in a spiral on a surface of said disc to a recording effect varying in accordance with said recording signal;

wherein said last-named means includes (a) means for rotating said disc, and (b) means for maintaining the frequency of disc rotation imparted by said rotating means substantially constant at a rate such that said disc completes a revolution during a time period which differs from that occupied by an integral number of line intervals

at said line repetition rate by a time interval several times smaller than that occupied by half a line interval.

5. A method of recording composite video signals having given field and line frequencies in successive regions disposed in a spiral on the surface of a disc, wherein said composite video signals represent successive frames of picture information, with each frame consisting of an even integral number of interlaced fields and an odd integral number of line intervals; said method comprising:

rotating said disc at a substantially constant rate chosen so that said disc completes a revolution during a time period which differs from that occupied by an integral number of line intervals by a time interval several times smaller than that occupied by half a line interval; and

subjecting said disc to translatory motion at a substantially fixed rate;

while exposing said successive regions of said disc surface to a recording effect responsive to said composite video signals.

4,022,969

APPARATUS FOR SIGNALLING THE POSITION OF A POINT ON A SURFACE

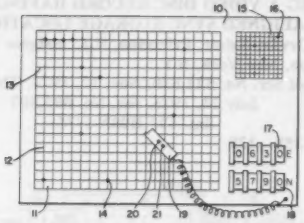
William Hall McKinlay, Edinburgh, and Robert Allan Reid Tait, Linlithgow, both of Scotland, assignors to Ferranti, Limited, Hollinwood, England

Filed Sept. 23, 1975, Ser. No. 616,000

Claims priority, application United Kingdom, Sept. 27, 1974, 41995/74

Int. Cl.² G08C *21/00*

U.S. Cl. 178—18 **15 Claims**



1. Apparatus for signaling the position of a point on a surface, which includes a main plotting area divided into a plurality of identical subsidiary areas, including primary transducer means operable to identify uniquely the subsidiary area in which the point is located, a subsidiary plotting area positioned at one side of said main plotting area representing to a larger scale a subsidiary area divided into a plurality of identical sub-divisions, and secondary transducer means operable to identify uniquely the sub-division of the subsidiary area in which the point is located.

4,022,970

FACSIMILE RECEIVER WITH IMPROVED FM DEMODULATOR

John M. Vandling, Pleasantville, N.Y., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 26, 1975, Ser. No. 617,105

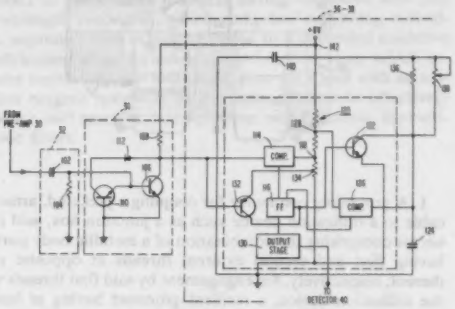
Int. Cl.² H04N *1/40;* **H03D** *3/00*

U.S. Cl. 358—298 **10 Claims**

1. In a facsimile receiver for producing a copy at a receiving location in response to signals representing light-dark variations in a document at a remote transmitting location, said receiver comprising means for generating trigger pulses having a frequency proportional to the frequency of received FM signals representing light-dark variations in a document, timing means coupled to said trigger pulse generating means for timing periods of predetermined duration, said timing periods being initiated in response to said trigger pulses, detector means coupled to the output of said timing means for generating a writing control signal varying as a function of the ratio of timing periods to the time between said timing periods, and writing means coupled to the output of said detector means for marking on a copy medium to reproduce light-dark variations of the document on the copy medium in response to said writing control signal, the improvement residing in said trigger pulse generating means comprising:

means for generating spaced pulses of opposite polarity having a frequency substantially proportional to the frequency of the received signal;

a first reference voltage means;



a second reference voltage means;

impedance means; and

a pair of parallel semiconductive paths connected in series with said impedance means between said first reference voltage means and said second reference voltage means, said parallel semiconductive paths being connected to said means for generating pulses of opposite polarity so as to be alternately conductive in response to pulses of opposite polarity thereby generating trigger pulses of the same polarity at said impedance means having a voltage excursion substantially independent of the amplitude of said spaced pulses of opposite polarity.

4,022,971

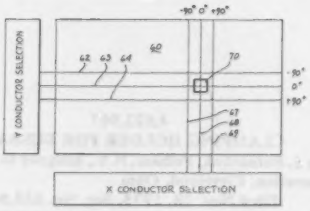
METHOD AND APPARATUS FOR CONVERTING THE LOCATION AND MOVEMENT OF A MANUALLY CONTROLLED INSTRUMENT INTO CORRESPONDING ELECTRICAL SIGNALS

James L. Rodgers, Tempe, Ariz., assignor to Talos Systems, Inc., Scottsdale, Ariz.

Continuation-in-part of Ser. No. 600,820, July 31, 1975, Pat. No. 3,983,322. This application Apr. 28, 1976, Ser. No. 681,334

Int. Cl.² G08C *21/00*

U.S. Cl. 178—19 **8 Claims**



1. Apparatus for obtaining an electrical signal corresponding to the position of an instrument along an axis on a surface having a plurality of conductors orthogonally oriented with respect to said axis and positioned proximate said surface, said apparatus comprising in combination:

a. means for generating a first signal having a predetermined frequency and phase;

b. means for advancing the phase of said first signal to

generate a second signal having the predetermined frequency and a phase leading said first signal;

c. means for retarding the phase of said first signal to generate a third signal having the predetermined frequency and a phase lagging said first signal;

d. means for selecting an active area on said surface, said area including the position of said instrument, and for generating a time varying electrostatic field across said active area by applying said first signal to a first of said conductors proximate said active area, applying said second signal to a second of said conductors proximate said active area, and applying said third signal to a third of said conductors proximate said active area.

e. means for sensing the phase and frequency of the time varying electrostatic field at the position of the instrument and generating a control signal in response thereto having said predetermined frequency and a phase unique to said position;

f. means for comparing said control signal to said first signal;

g. means for changing the predetermined frequency until a first stable condition is reached in which said control signal compares to said first signal in accordance with a predetermined relationship;

h. means for producing a first output signal representative of said first stable condition;

i. means for reversing said second signal and said third signal to apply said second signal to said third conductor and said third signal to said second conductor, thereby changing the electrostatic field at the position of the instrument;

j. means for sensing the changed electrostatic field and changing said control signal in response thereto;

k. means for changing the predetermined frequency until a second stable condition is reached in which said changed control signal compares to said first signal in accordance with said predetermined relationship.

l. means for producing a second output signal representative of said second stable condition; and

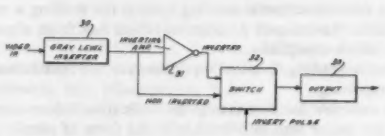
m. means for combining said first output signal with said second output signal to obtain a differential output signal uniquely corresponding to the position of the instrument on the surface.

4,022,972

TRANSIENT SUPPRESSION AND GREY LEVEL COINCIDENCE IN A SUBSCRIPTION TELEVISION SYSTEM

H. George Pires, Parlin, N.J., assignor to Teleglobe Pay TV System Inc., Rego Park, N.Y.

Filed May 13, 1975, Ser. No. 577,047
Int. Cl.² H04N *1/44*
U.S. Cl. 358—124 **16 Claims**



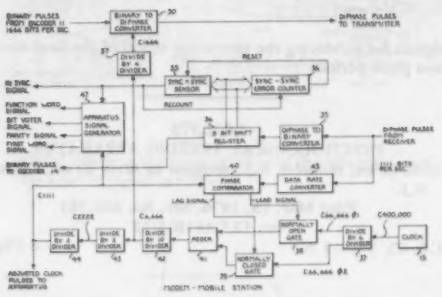
6. Apparatus as set forth in claim **5**, wherein said invert signal is an invert pulse; and wherein said means for applying said invert signal to said control electrodes of said second and sixth amplifier means comprise a bistable circuit having a first bistable output connected to said control electrode of said second amplifier element, a second bistable output connected to said control electrode of said sixth amplifier element and a control input for receiving said invert pulses, for furnishing a bistable output signal blocking said second amplifier element at said first bistable output in the absence of said invert pulse for furnishing a bistable output signal at said second bistable output for blocking said sixth amplifier element in response to said invert pulse.

4,022,973

APPARATUS FOR INDICATING SYNCHRONIZATION AND OUT-OF-SYNCHRONIZATION CONDITIONS

Bill L. Stackhouse, and Theodore E. Taylor, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed May 12, 1975, Ser. No. 576,279
Int. Cl.² H04L *7/04*
U.S. Cl. 178—69.1 **7 Claims**



1. For use in a radio communication system having at least a transmitter at a first location and at least a receiver at a second location for communicating therebetween synchronizing apparatus comprising:

a. means adapted to be connected to said receiver for deriving binary signals therefrom;

b. means connected to said deriving means for producing a message in-synchronization signal in response to derived binary signals having first response to derived binary signals having first and second sequential sysnchronizing words, each of which has a determined sequence of binary values;

c. and means connected to said deriving means for causing said producing means to produce a message out-of-synchronization signal in response to derived binary signals having a plurality of consecutive synchronizing words, each of which has a sequence of binary values that differ from said predetermined sequences of binary values.

4,022,974

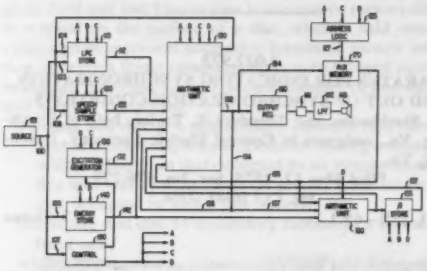
ADAPTIVE LINEAR PREDICTION SPEECH SYNTHESIZER

Joseph Kohut, Basking Ridge, and Joseph Philip Olive, Martinsville, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 3, 1976, Ser. No. 692,425
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1.5 M **26 Claims**

26. An artificial speech synthesizer for producing a speech signal from pitch period segmented parametric description signals comprising means for storing a pitch period speech corrective signal; means operative in regularly spaced time periods of the currently occurring pitch period responsive to the parametric description signals of said current pitch period and said pitch period corrective signal for generating samples of said pitch period speech segment, means operative in intervals between said spaced time periods responsive to the parametric description signals of the next successive pitch period for forming signals representative of a prescribed set of component codes of the speech corrective signal of the next suc-

cessive pitch period; and means operative upon termination of the last spaced time period responsive to said component code



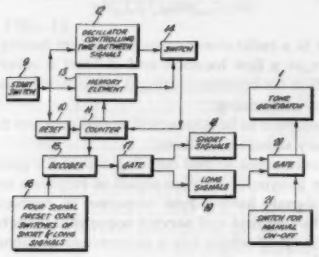
signals for producing the corrective signal of the next successive pitch period.

4,022,975

PSYCHOLOGICAL TESTING APPARATUS

Alvin Krass, Holmdel, N.J., assignor to Alvin Krass, Holmdel, N.J.

Filed Mar. 15, 1976, Ser. No. 666,781
Int. Cl.² A61B 5/12
U.S. Cl. 179—1 N **6 Claims**



1. A compact portable apparatus for screening human subjects for deafness, auditory memory and hearing side-dominance which comprises, in combination

a. electronic means for generating audible frequencies;

b. means for converting said audible frequencies into sounds delivered separately to the individual ears of a human subject;

c. means for controlling the delivery of said sounds into one or the other ear of said human subject or to both ears;

d. means for controlling the delivery of said sounds (as continuous sounds or interrupted) in a preset pattern of long and short pulses

e. means for control of the audible volume of said sounds; and

f. means for control of the frequency of said sounds.

4,022,976

MECHANICALLY-COUPLED MICROPHONE-SPEAKER UNIT AND INTERCOM SYSTEM

Jerry O'Brien, deceased, late of Jersey City, N.J., and by Catherine H. O'Brien, executrix, 33 Pamrapo Ave., Jersey City, N.J. 07305

Filed Apr. 19, 1976, Ser. No. 677,877
Int. Cl.² H04M 7/10
U.S. Cl. 179--1 H **12 Claims**

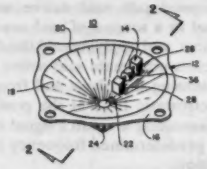
1. A sound apparatus comprising:

a. a loudspeaker for converting variations of electric energy into corresponding variations of acoustic energy, including:

1. a diaphragm;

2. coil means coupled to the diaphragm, said coil means adapted to receive the variations of electric energy and in response thereto causing said diaphragm to vibrate, and

b. an electromechanical sound transducer for converting acoustic energy into variations of electric energy, including:



3. conductive support means mounted onto said loudspeaker diaphragm and adapted to be connected to a source of electric energy;

4. weighted conductive bar means loosely coupled to said support means, said support means transmitting vibrations of said diaphragm to said bar means,

and wherein said loudspeaker and said sound transducer form a first station.

4,022,977

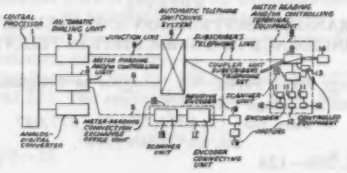
AUTOMATIC METER-READING AND CONTROLLING SYSTEM

Jutaro Nomura, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 456,445, April 1, 1974, abandoned, which is a continuation-in-part of Ser. No. 328,485, Jan. 31, 1973, abandoned. This application Dec. 17, 1975, Ser. No. 641,496

Claims priority, application Japan, July 14, 1972, 47-83178; July 29, 1972, 47-76219; July 11, 1972, 47-69380; July 14, 1972, 47-70562

Int. Cl.² H04M 11/00
U.S. Cl. 179—2 AM **10 Claims**



1. An automatic meter-reading system for reading a meter at a remote station over a communication link from a central station which comprises:

A. meter-reading terminal equipment at the remote station comprising:

an encoder for converting the indicative information of the meter into information in the form of ohmic resistance; and a scanner unit having:

at least three predetermined resistors which have different predetermined resistance values from one another;

a group of switches, each of which is respectively connected in series to an output resistance of the encoder or each of the predetermined resistors, and which are arranged in an predetermined sequence; and

a scanner turning on the switches progressively and selectively;

B. a meter-reading center at the central station comprising:

a stabilized D.C. voltage supply;

an electrical signal measuring apparatus for measuring

the electrical signals caused by the current passing through input terminals of a four-terminal network including a communication link and for converting the electrical signals into a computer code which is transmitted to a central processor;

a switch for automatically coupling the electrical signal measurement apparatus to the meter-reading terminal equipment over the communication link and for automatically applyingg stabilized D.C. voltage from the supply to input terminals of the four-terminal network after seizing the communication link under the control of a central processor;

and

wherein said central processor is connected to the meter reading terminal equipment through the communication link for controlling the operation of the switch in a meter-reading center, the electrical signal measuring apparatus, and the meter-reading terminal equipment for coupling the encoder to the communication link and for measuring the unknown resistance of the encoder over the communication link;

C. means disposed in the meter-reading center for progressively turning on the switches in the scanner unit by driving the scanner under the control of the central processor; and

D. means disposed in the meter-reading center for indirectly measuring the unknown output resistance of the encoder from at least three values of the predetermined resistors in the scanner unit and electrical signals measured by the electrical signal measuring apparatus while selectively connecting each of the predetermined resistors in the scanner unit or unknown output resistance of the encoder to output terminals of the four-terminal network including the communication link, by calculation based upon a set of the following relations for a passive linear four-terminal network

$$Z_1 = \frac{AZ_2 + B}{CZ_2 + D}$$

Where Z_1 is the input impedance which is the ratio of the input voltage to the input current in case that the four-terminal network is loaded with an impedance Z_2 and A, B,C, and D are generalized network parameters termed four general circuit parameters or cascade parameters and there is the following relation between these parameters

$AD - BC = 1$.

4,022,978

EVENT MONITORING TRANSCEIVER

Joseph B. Connell, Moorestown; Stephen M. Fillebrown, Cherry Hill; Michael J. Horwitz, Willingboro, all of N.J., and John C. Watson, Levittown, Pa., assignors to Telesciences, Inc., Moorestown, N.J.

Filed Nov. 14, 1975, Ser. No. 632,010

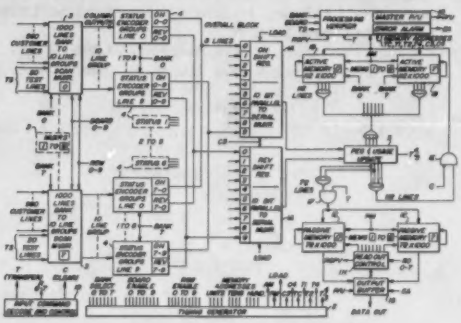
Int. Cl.² H04M *15/18*

U.S. Cl. 179—8 A **59 Claims**

1. Event monitoring apparatus for coupling to and automatically examining at cyclically repeating time intervals the signal conditions on a signal circuit comprising,

a. signals receiving monitor means for determining that particular kinds of circuit conditions have occurred on said signal circuit and operative to generate a first data signal upon such occurrences,

b. timing means including first means for determining the duration of the occurrence of said particular kinds of signal conditions commencing with the end of a predetermined time period after said monitor means has determined that one of said particular kinds of signal condition has occurred and operative to generate a second data



signal denoting the time duration of the aforesaid particular kind of signal condition.

4,022,979

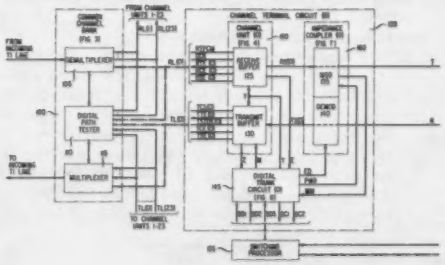
AUTOMATIC IN-SERVICE DIGITAL TRUNK CHECKING CIRCUIT AND METHOD

Nicholas Kimbrough Smith, Naperville, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 29, 1975, Ser. No. 645,195

Int. Cl.² H04J *3/14*

U.S. Cl. 179—15 BF **18 Claims**



14. In a space-division switched, time-division multiplexed telecommunications system having an incoming and outgoing multiplexer for distributing a plurality of time-division channels of a time-division multiplexed line among a plurality of space-division trunks, and vice versa, a method for automatically checking the digital performance of one of said trunks comprising,

placing the incoming and outgoing ends of said one of said trunks in a continuity check state,

exchanging voltage bias signals between said incoming and outgoing ends of said one of said trunks,

signalling said multiplexers when said voltage bias signals have been successfully exchanged to apply identical current-modulated digital test codes at each of said ends, and

comparing said digital test codes received at each of said multiplexers to verify the digital integrity of said one of said trunks.

4,022,980
RING TRIP DETECTOR

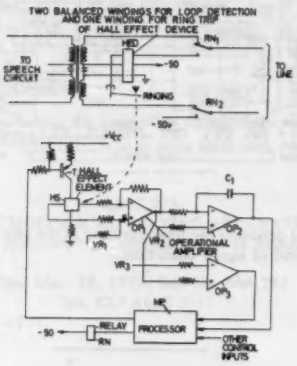
Ryszard Kitajewski, Broxbourne; Anthony William Sweet, Bishops Stortford, and Michael Philip Dyer, Old Harlow, all of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Mar. 3, 1976, Ser. No. 663,396

Claims priority, application United Kingdom, Mar. 25, 1975, 12370/75

Int. Cl.² H04M 3/02

U.S. Cl. 179—18 HB **6 Claims**



1. An electrical ring trip detection circuit comprising:

a Hall effect device to couple ringing current to a called subscriber's subset line and to generate at its output an output voltage that is proportional to the current flow to said line;

first means coupled to said device responsive to said output voltage to indicate whether or not direct current is on said line superimposed on said ringing current; and

second means coupled to said first means and said device to disconnect said ringing current and to complete the connection to said line for communication between a calling party and a called party when said direct current is detected;

said Hall effect device including

three windings, one of said three windings and said ringing current being coupled to said line during a ringing operation and being disconnected from said line when ring trip occurs with the other two of said three windings being inserted in said circuit upon occurrence of ring trip, said other two of said three windings being balanced windings each of which are included in a different leg of said line when looped to enable monitoring off-hook and on-hook condition of said line.

4,022,981
CONFERENCE CIRCUIT FOR PULSE CODED MODULATED TELEPHONY

Donald W. McLaughlin, Bolingbrook, and David Q. Lee, Chicago, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed July 28, 1976, Ser. No. 709,580

Int. Cl.² H04M 3/56

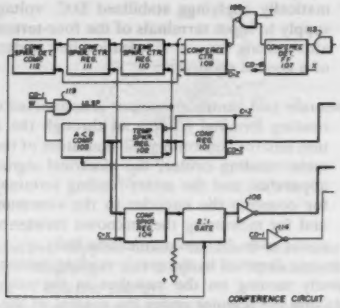
U.S. Cl. 179—18 BC **5 Claims**

1. In a pulse code modulated communication system, a plurality of communication channels arranged on a multiplexed basis, a switching system including a memory accessed by said communication channels, and a conference circuit connected to said memory and to said channels, said conference circuit comprising:

a first register connected to said memory operated to store the coded value of information from each of said channels conducted sequentially through said memory;

a second register connected to said first register and including output circuit connections to said channels;

a first comparator circuit connected to said first and to said second registers operated to compare the coded value of information stored in said first and said second registers and in response to determination that the value of information stored in said first register is less than the value of information stored in said second register to cause the coded value of information stored in said first register to be transferred to said second register for transfer of said coded value of information to said channels under control of said switching system.



4,022,982
APPARATUS FOR REARRANGEMENT OF A SWITCHING NETWORK

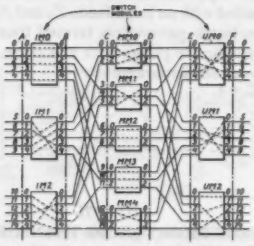
Göran Anders Henrik Hemdal, Skarholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Dec. 4, 1975, Ser. No. 637,835

Claims priority, application Sweden, Dec. 20, 1974, 7416098

Int. Cl.² H04Q 11/04

U.S. Cl. 179—15 AT **4 Claims**



1. A switching system comprising: a plurality of input switching modules, each of said input switching modules having several input-switching-module inputs which are network inputs, several input-switching-module outputs, and input-switching-module switching control means for connecting each of said input-switching-module inputs to any one of said input-switching module outputs in response to control signals; a plurality of output switching modules, each of said output switching modules having several output-switching-module inputs, several output-switching-module outputs which are network outputs, and output-switching-module switching control means for connecting each of said output-switching-module inputs to any one of said output-switching module outputs in response to control signals; a plurality of center switching modules, each of said center switching modules having several center-switching-module inputs, several center-

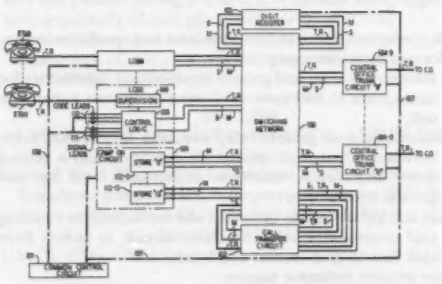
switching-module outputs, and center-switching-module switching control means for connecting each of said center-switching-module inputs to any one of said center-switching-module outputs in response to control signals; a first plurality of links, each link of said first plurality connecting a different one of said input-switching-module outputs to a different one of said center-switching-module inputs; a second plurality of links, each link of said second plurality connecting a different one of said center-switching-module outputs to a different one of said output-switching-module inputs; a switch memory means having a plurality of memory cells, each of said memory cells having an address related to a link in one of said pluralities of links, each of said memory cells storing a first information unit indicating which of the network inputs should be connected to the link associated with the cell address and also storing a second information unit indicating which of the network outputs should be connected to the link associated with the cell address; control signal generating means responsive to the information units stored in said memory cell for generating control signals fed to the switching control means on said switching modules to effect the connections between network inputs and network outputs as recorded in said memory cells; means for receiving information units representing a first network input and a first network output between which a connection is desired; means for locating a first memory cell storing the information unit of said first network input and for locating a second memory cell storing the information unit of the first network output; means for interchanging information units recorded in said first and second memory cells so that the information units of said first network input and said first network output go into the same memory cell; and analyzing means for determining whether the new connections established by said switching modules in response to the new information units recorded in said first and second memory cells correspond to the desired connection.

4,022,983

TELEPHONE SWITCHING SYSTEM HAVING AUTOMATED CALL HOLD FACILITIES

Edwin Julius Braun; Michael Stephen Lane; Henry August Meise, Jr., all of Boulder, and George William Taylor, Broomfield, all of Colo., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 2, 1975, Ser. No. 592,610
Int. Cl.² H04M *3/42*
U.S. Cl. 179—18 B **17 Claims**



1. In a telephone switching system wherein communication connections are established between stations and trunk circuits, a hold arrangement comprising:

a digit register circuit,

means for connecting said digit register circuit to an existing communication connection between a station and a first trunk circuit, said connecting means being activated by a switchook flash from said station,

means for detecting the dialing of digits representing a call hold code into said digit register circuit from said station,

means responsive to a detected dialed call hold code for placing said first trunk circuit in a hold state,

means also responsive to a detected dialed call hold code for releasing said communication connection from said station to said digit register circuit and for establishing a second communication connection from said station to a second trunk circuit, and

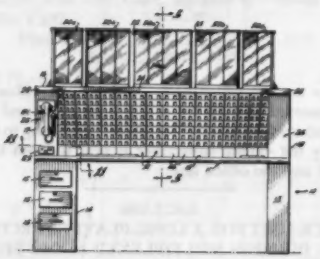
means for reestablishing said communication connection from said station to said first trunk circuit, said reestablishing means being activated by the release of said second communication connection.

4,022,984

TELEPHONE ANSWERING SERVICE CONSOLE

Steven M. Gray, 625 Biltmore Way, Coral Gables, Fla. 33134

Filed June 18, 1976, Ser. No. 697,674
Int. Cl.² H04M *5/02*
U.S. Cl. 179—91 R **10 Claims**



1. A telephone answering service console comprising, in combination, a desk-like console member having a horizontal main deck supported by laterally-opposed pedestal members, a directory deck member, means supporting said directory deck member in spaced parallel relation above said main deck member, said directory deck support means defining a vertically-extending space between said main deck and said directory deck, a plurality of message slip racks arranged in said space between said main deck and said directory deck, each of said message racks comprising a plurality of vertically-stacked message slip receptacles, a plurality of subscriber account name directories supported upon said directory deck for visual display to a console operator stationed in front of the console, a subscriber account numerical directory supported in horizontal disposition by said main deck and substantially flush with said main deck for ready visual observation by the console operator, and call receiving and switching means mounted in said main deck.

4,022,985

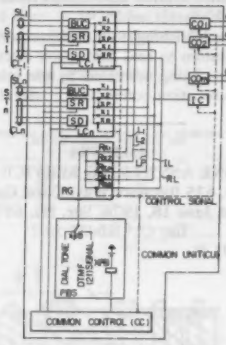
KEY TELEPHONE SYSTEM WITH A COMMON PUSH-BUTTON SENDER SYSTEM

Yoshiaki Tanaka, Tokyo, Japan, assignor to Oki Electric Industry Company, Ltd., Japan

Filed Sept. 22, 1975, Ser. No. 615,528
Claims priority, application Japan, Oct. 1, 1974, 49-112336
Int. Cl.² H04M *1/72*
U.S. Cl. 179—99 **3 Claims**

1. A key telephone system comprising a plurality of key telephone sets having at least a push-button dial and a shift register connected to said push-button dial, and a common unit connected to each telephone set via a signal line and to the shift register of each telephone set via a control line, said common unit including a common control, a line connection circuit connected to said common control and responsive to control signals on said control line, and a common push-button sender connected to said common control for sending dial tone and a DTMF signal according to the common control in response to a control signal applied to said control line by said

shift register, characterized in that said common unit has at least a register link and a central office line link, said register link being connected to both a calling subscriber and said push-button sender so that said calling subscriber can hear said two-frequency signal while the calling subscriber selects



one of the central office lines, said central office line link being connected to both the calling subscriber and the push-button sender so that the DTMF signal according to the dialed number by the calling subscriber is sent to both the calling subscriber and the office line.

4,022,986

PLAYBACK UNIT FOR A LONG-PLAYING RECORD OF A TIME DIVISION MULTIPLEXED AUDIO SIGNAL

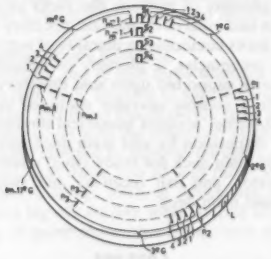
Kees Teer; Peter Johannes Michiel Janssen, and Laurentius Antonius Peter Maria de Bot, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 464,787

Claims priority, application Netherlands, Feb. 15, 1974, 7402077

Int. Cl.² G11B 7/00, 27/30

U.S. Cl. 179—100.3 B **9 Claims**



1. A playback unit for an associated long-playing record on which sound information is recorded in *r* information track segments provided as substantially concentric circles or provided as a spiral on the record in the form of sound signal pulses in time division multiplex code, and a starting pulse at the beginning of each track segments, said recorded sound signal pulses being distributed in *m* groups of *n* ordered recorded sound signal pulses per group in each track segment, said unit comprising follower means for causing a pick-up device to follow an information track, a detector detecting pulses derived through the pick-up device from the record, said pulses comprising the sound information in said time division multiplex code and said starting pulses, separating means for separating said sound signal pulses read from said record from said starting pulses, a sound reproducing device, sampling gate means responsive to sampling signals for passing said sound signal pulses to said sound reproducing device, a first synchronization means responsive to said sound signal pulses from said separating means for periodically providing said sampling gate means with a plurality of series of first sampling signals in response to each *n* sound signal pulses, second synchronization means connected to said first synchronization means and responsive to said starting pulses from said separating means for initiating each of said plurality of series of first sampling signals at instants corresponding sequentially to the ordered sound signal pulses of said first group of sound signal pulses in each track segment, and for causing said follower means to force said pick-up means to scan a next subsequent track to be scanned after *n* revolutions of the record during which the same track segment has been scanned.

4,022,987

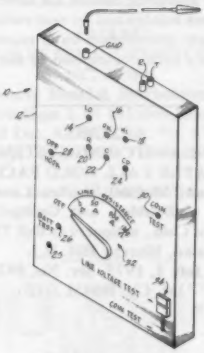
COIN TELEPHONE STATION SIMULATOR AND CONDITION INDICATOR

Orrin B. O'Dea, Garden Grove, Calif., assignor to Communication Mfg. Co., Long Beach, Calif.

Filed Mar. 30, 1976, Ser. No. 672,258

Int. Cl.² H04M 3/26

U.S. Cl. 179—175 **24 Claims**



15. A coin telephone station simulator and condition indicator for use by a user comprising:

at least separate tip and ground input/output conductors for connection to and removal from a telephone system for test;

controllable coin present relay simulator means switchable between a first high impedance condition and a second lower impedance condition in between said tip and ground conductors;

coin test switch means operable when switched for enabling said controllable relay simulator circuit to switch from said first to said second condition;

coin present indicator means;

means for energizing said coin present indicator means when said relay simulator means is in said second lower impedance condition;

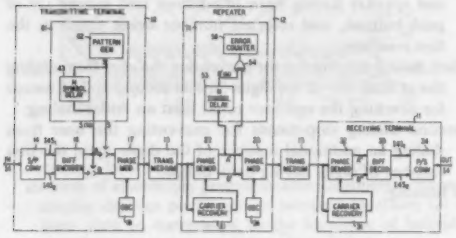
means for providing separate coin collect and coin return indications; and

coin collect and return detection means responsive to first and second electrical signals, of opposite polarity, momentarily and separately applied in between said tip and ground conductors for, respectively, providing unique coin collect and coin return electrical signals to said coin collect and coin return indication means.

4,022,988
FAULT LOCATING APPARATUS FOR DIGITAL TRANSMISSION SYSTEM

George Howard Lentz, Andover, and Richard Palmer Slade, North Andover, both of Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 14, 1976, Ser. No. 695,522
Int. Cl.² H04B 1/60
U.S. Cl. 179—175.31 R 4 Claims



1. Apparatus for locating faults in a digital transmission system of the type that includes a transmitting terminal, a receiving terminal, and at least one intermediate repeater station, said transmitting terminal including:

a serial-to-parallel converter having an input connected to the incoming bitstream for generating on first and second rails two output bitstreams for generating on first and second rails two output bitstreams at half the rate of the incoming bitstream;

a differential encoder connected to said serial-to-parallel converter for differentially encoding the bitstreams on said first and second rails;

a sinusoidal oscillator; and

a four-phase, phase-shift modulator connected to both output rails from said differential decoder for modulating the output of said sinusoidal oscillator,

characterized in that said transmitting terminal further comprises:

means for generating a fixed test pattern, S, having the property that

$$\overline{S(2N)} = S$$

where

$$N \geq 1,$$

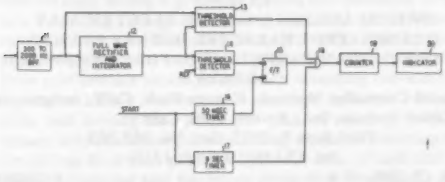
said test pattern having a length $L = 4N$ and being applied to both input rails of said phase-shift modulator; and

means, interposed between said pattern generating means and one of said rails, for delaying said test pattern by N symbols.

4,022,989
TELEPHONE RECEIVER-OFF-HOOK-AND-IN-USE DETECTOR

Richard Scott Hoppough, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,293
Int. Cl.² H04M 3/22
U.S. Cl. 179—175.2 C 5 Claims



3. A combination for connection to a transmission line for detecting speech signals on said line, said combination comprising

input terminals,

first means connected to said input terminals for producing an output each time a peak in an input signal exceeds a threshold level in excess of $\sqrt{2}$ times the rms value of said signal,

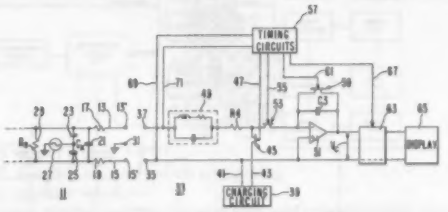
second means connected to said first means for producing an output for a predetermined interval each time said rms value falls below a predetermined level, and

third means connected to said first and second means to count said first means outputs only when said second means output is present.

4,022,990
TECHNIQUE AND APPARATUS FOR MEASURING THE VALUE OF A CAPACITANCE IN AN ELECTRICAL CIRCUIT SUCH AS A TELEPHONE COMMUNICATION LINE

Paul R. Bauer, Palo Alto, Calif., assignor to Wiltron Company, Palo Alto, Calif.

Filed Oct. 28, 1975, Ser. No. 626,315
Int. Cl.² H04B 3/46
U.S. Cl. 179—175.3 F 29 Claims



1. A method of determining the capacitance of an electrical circuit having a periodic interfering voltage induced or generated therein, comprising the steps of:

applying a direct current voltage to the circuit for a time sufficient to charge the capacitance thereof,

transferring for a time substantially all of the charge from said circuit capacitance to a capacitor of known value outside of said circuit,

monitoring the circuit during said transfer time to detect a fundamental frequency of said interfering voltage, said transfer time being made equal to an integral number of periods of the detected fundamental frequency of said interfering voltage in circuit, and

measuring the voltage across said known capacitor, whereby said voltage is proportional to the capacitance of said electrical circuit.

4,022,991
CONFERENCING ARRANGEMENT FOR USE IN A PCM SYSTEM

Michael J. Kelly, Melrose Park; Alex W. Kobylar, Chicago; Robert L. Lindsay, Palatine; Satyan G. Pitroda, Villa Park, and Charles J. Simon, Hinsdale, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 18, 1975, Ser. No. 614,405
Int. Cl.² H04M 3/56
U.S. Cl. 179—18 BC 6 Claims

1. In a pulse code modulated communication system:

a. a plurality of terminations,

b. a plurality of channels, each of which is associated with one of said terminations and is assigned a time slot,

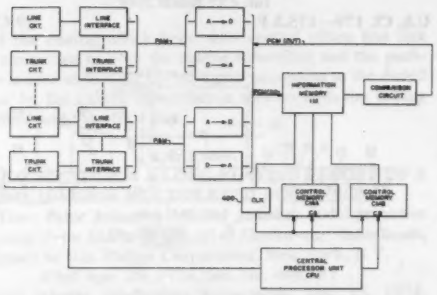
c. an information memory for storing information from each of the plurality of channels, transmit information from each of the plurality of channels stored in a first fixed location of the the information memory and receive infor-

mation from each of the plurality of channels stored in a second fixed location of the information memory,

d. a first control memory having a control memory word corresponding to each of the plurality of channels for storing the address location within the information memory of the channel to which that channel is to be connected for conversation,

control means for cyclically controlling the operation of the system, the control means during the assigned time slot to a channel writing the information from that channel into the information memory, reading the control memory words corresponding to that channel from the control memory to address the information memory to read out the information stored therein at the addressed location, and to transmit the information read therefrom to that channel, to thereby permit that channel to engage in conversation with another channel,

e. a second control memory having a control memory word corresponding to each of the plurality of channels for storing the address location within the information memory of a second channel to which that channel is to be connected for conversation,



f. a comparison means for comparing and transmitting as an output thereof the larger of two samples of information coupled to it,

g. said control means during a time slot assigned to a channel writing the information from that channel into the information memory, reading the control memory words corresponding to that channel from each of the control memories for addressing the information memory to read out the information stored therein at the two addressed locations, and to transmit the information to said comparison means, the largest of the two samples of information coupled to said comparison means being coupled to that channel,

h. whereby three-way conferencing between the plurality of channels can be provided; and

i. a dial tone source, said dial tone source being assigned a time slot and being available to supply dial tone to all of said terminations by writing the time slot number assigned to said dial tone source in the respective ones of said control memory words in said control memory associated with said channels.

4,022,992

PHONE GUARD FOR LOCKING OUT LONG-DISTANCE CALLS

Austin R. Q. Kennedy, Sanford Station, 3751 W. 6th St., Los Angeles, Calif. 90005

Filed May 21, 1976, Ser. No. 688,922

Int. Cl.² H04M *1/66*

U.S. Cl. 179—189 D **7 Claims**

1. A telephone lock attachable to a telephone, the telephone having first dialing means for dialing a multiplicity of digits and an operatively hand-held receiver and speaker placeable on a first set of depressable push-buttons, the lock permitting a user to dial local calls only, the local calls being dialable with a first predetermined number of digits, at least one of the digits being assigned for calling an operator, comprising:

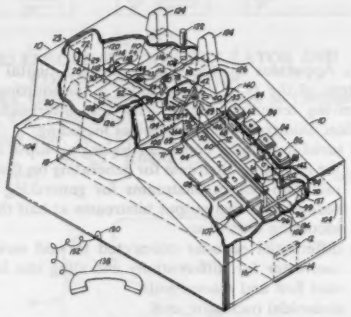
a second set of depressable push-buttons for said receiver and speaker to rest upon and for making contact with the first set of push-buttons, respectively, when the receiver and speaker are inoperative;

second dialing means having an initial state connected to the first dialing means for enabling a user to dial a selected number of the digits sequentially upon the receiver and speaker having been lifted from said second set of push-buttons, said selected number being equal to the first number;

first dialing stop-means for preventing the user from dialing the at least one of the digits on said second dialing means for reaching the operator on at least an initial dialing;

second dialing stop-means for preventing the user from dialing an additional number of the digits upon the first number of digits having been dialed;

a housing;



counting means for counting the first number of digits, including a shaft, a gear rotatable on the latter and formed with a plurality of substantially equispaced longitudinal fingers, said plurality being numerically equal to said first number plus one, one of said fingers being an elongated finger exceeding the remaining fingers in length, and a torsion spring having two ends and being attached with one end thereof to said shaft and with the other end thereof to said gear for urging the latter to move in one direction, said gear being advanceable one angular step equal to the spacing between adjacent fingers upon the dialing of one of the digits, said torsion spring being stepwise windable by the dialing of said one of the digits, said second dialing stop-means including a bar attached to said housing for stopping the advancement of said gear upon said bar impinging on said elongated finger and upon said gear having been rotated by a plurality of steps numerically equal to said first number; and

resetting means for resetting said second dialing means to said initial state upon the receiver and speaker having been replaced on said second set of push-buttons.

4,022,993

SWITCH ASSEMBLY HAVING ELECTRICALLY ILLUMINATED CHARACTER DISPLAY DEVICES BETWEEN TRANSPARENT ACTUATORS AND SWITCH ARRAYS

Ronald Corroalles Shattuck, Canoga Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed June 9, 1975, Ser. No. 585,203

Int. Cl.² H01H *9/00, 13/70*

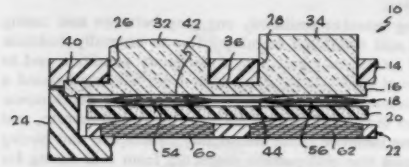
U.S. Cl. 200—5 A **6 Claims**

1. A keyboard assembly, comprising:

an array of electromechanical switches;

a thin flexible base plate adjacent the array of switches capable of transmitting actuating force to the switches;

a resilient cushion mounted between the flexible base plate and the array of switches for absorbing a portion of the actuating force applied to the devices and for dissipation



of snap back forces from the switches; and

an array of electrically programmable illuminated character display devices positioned at selected locations on the base plate to correspond to the locations of individual switches in the electromechanical switch array.

4,022,994

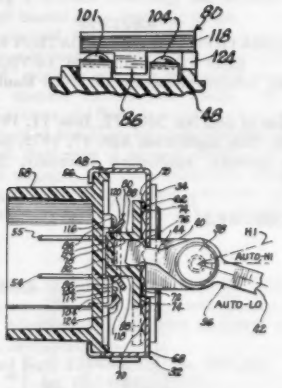
SLIDE ACTION ELECTRICAL SWITCHES HAVING CONTACT DETENTING STRUCTURE

Andrew F. Raab, Morton Grove, and Raymond T. Halstead, Wheeling, both of Ill., assignors to Indak Manufacturing Corporation, Northbrook, Ill.

Filed May 28, 1975, Ser. No. 581,545

Int. Cl.² H01H *15/02, 1/50*

U.S. Cl. 200—16 C **7 Claims**



7. An electrical switch, comprising a casing, an insulating carriage movable in said casing, a conductive contactor plate mounted on said carriage and movable therewith along a predetermined path, and electrically conductive contact means secured in and to said casing and disposed along said path for selective engagement by said contactor plate, said contactor plate having a generally rectangular slot therein, said carriage having a generally rectangular insulating projection extending through and mating with said slot for causing said contactor plate to move with said carriage, said contactor plate being slidable along said projection toward and away from said contact means, said switch including resilient biasing means acting between said carriage and said contactor plate and biasing said contactor plate toward said contact means, said contactor plate including a pair of stablizing tabs projecting from said plate on opposite sides of said slot and slidably engaging said insulating projection on opposite sides thereof for stabilizing the sliding movement of said contactor plate along said insulating projection.

4,022,995

INTERMEDIATE LEVERS FOR SAFETY CUT-OUT SWITCH WITH LOCK

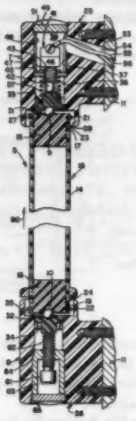
Paul Merkle, Eschenbrunnlestr. 48, 7032 Sindelfingen, Germany

Filed June 11, 1975, Ser. No. 585,748

Claims priority, application Germany, June 12, 1974, 2428295

Int. Cl.² H01H *9/28*

U.S. Cl. 200—44 **6 Claims**



1. A safety cut-out switch comprising

a rotatable knob,

a disk-shaped member integral with said rotatable knob and having at its lower periphery a notch,

a lever engagable into said notch for locking said disk and to thereby lock said knob in the cut-out position of the switch,

a lever blocking member for blocking said lever in its disk-locking position, and

a key-actuated unlocking means for removing said lever from its disk-locking position,

said disk-shaped member surrounding the base of said rotatable knob and having said notch extending in the switched-off position in a vertical downward direction,

said lever having a forward upper end portion and a rear fulcrum and being arranged to be swivelled about said rear fulcrum and to engage and disengage said notch by upward and downward movement, respectively, of said forward upper end portion,

said lever blocking member comprising a lock insert controlling by its outward and inward movement the upward and downward movement of said forward upper end portion of said lever,

said lock insert being moveable outward only when said notch is extending in the switched-off position.

4,022,996

SWITCH MECHANISM FOR BUS DOORS WITH MANUALLY OPERATED TOUCH BAR

Richard L. Lucas, Owosso, and Robert M. Gute, Corunna, both of Mich., assignors to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 11, 1975, Ser. No. 612,444

Int. Cl.² H01H *3/16;* **E05F** *15/00*

U.S. Cl. 200—61.43 **9 Claims**

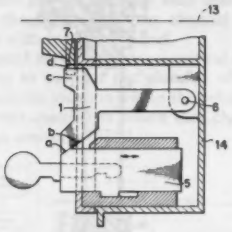
1. Manually operable switch apparatus comprising a touch bar and first and second spaced assemblies to which opposite end portions of the bar are attached, each assembly having a housing normally fixed to a common base, said bar having fixed to one end portion an end plug; said first assembly comprising:

one of said housings providing a recess for receiving said end plug defined partially by an interior circular side wall surface having a radial clearance with said end plug and any associated portion of the bar extending thereinto, said housing defining a bore extending in coaxial relation with the recess further inwardly of the housing;

a switch fixed to said housing having a plunger protruding coaxially into said bore;

a piston received in said bore normally positioned against said plunger, said piston and said end plug having opposing concave surfaces;

an element providing a circular surface received between, and normally in engagement with, both of said concave surfaces



resilient means located between said switch and said piston for urging said bar, said element, said piston, and switch to neutral centered positions placing said switch in an unactuated condition;

said second assembly having its housing normally attached to said base to locate the second assembly in fixed axially spaced relation with said first assembly so as to engage and act on the bar in its longitudinal direction to maintain series contact between said end plug, said element, said piston, and said plunger; and

said bar and end plug being laterally movable relative to said housing to roll said element on said concave surfaces and thus move said piston and plunger to effect actuation of the switch.

4,022,997

COLLISION DETECTING APPARATUS FOR MOTOR VEHICLES

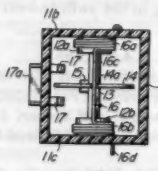
Mitsuo Inagaki, Okazaki; Hideaki Sasaya, and Akihiro Kobayashi, both of Aichi, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Nov. 25, 1975, Ser. No. 635,073

Claims priority, application Japan, Nov. 27, 1974, 49-145021[U]; Aug. 1, 1975, 50-94463; Aug. 5, 1975, 50-95505; Aug. 9, 1975, 50-110071[U]

Int. Cl.² H01H *35/14*

U.S. Cl. 200—61.45 R **11 Claims**



1. Apparatus for detecting the collision of a motor vehicle, comprising:

a casing;

a shaft supported by said casing;

a disk-like rotational member supported, at the center thereof, by said shaft;

bearing means mounted on at least one of said casing and said shaft for rotatably supporting said rotational member;

a column-like weight member which is mounted on said rotational member so as to shift from the center axis of said shaft the center of mass of the rotational member including said column-like weight member, thereby said rotational member is rotated under acceleration or deceleration;

a spring member resiliently engaging between said casing and said rotational member so as to normally maintain said rotational member in a stationary condition and to prevent said rotational member from rotating beyond a predetermined angle when acceleration or deceleration lower than a predetermined level is exerted thereto, said spring member being electrically conductive and having at least one end portion projected from said casing for connection to an electrical circuit;

a movable contact member which is fitted to said rotational member for rotation with said rotational member, and is electrically connected to said spring member;

a stationary resilient contact member secured to said casing for contacting said movable contact when the latter is rotated beyond a predetermined angle, whereby a circuit path generating an electrical collision signal is established.

4,022,998

ACCELERATION AND RETARDATION RESPONSIVE ELECTRIC CONTROL DEVICE

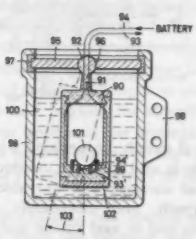
Artur Föhl, Schelmenwasenstr. 68, 7061 Haubersbronn, Germany

Division of Ser. No. 368,972, June 11, 1973, Pat. No. 3,927,286. This application Apr. 17, 1975, Ser. No. 569,096

Claims priority, application Germany, June 13, 1972, 2228683

Int. Cl.² H01H *35/14*

U.S. Cl. 200—61.45 R **11 Claims**

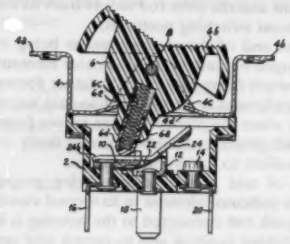


1. An acceleration and retardation responsive device comprising; housing means, a mass element in said housing means, a support member in said housing having an upwardly facing annular seat on the upper end thereof engaging said element in a region radially spaced from the vertical central axis of the element whereby said element is displaceable from said seat in response to a predetermined force of acceleration exerted between said seat and said element in any direction, and means operable in response to lateral movement of said element relative to said seat for actuating switch means adapted for connection in an external control circuit, and vertical damping means supporting said housing in a damped manner against vertical impacts.

4,022,999
PLURAL-CIRCUIT PROGRESSIVE SWITCH

Harry W. Brown, Big Bend, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Oct. 7, 1975, Ser. No. 620,371
Int. Cl.² H01H *13/28*
U.S. Cl. 200—67 G 7 Claims

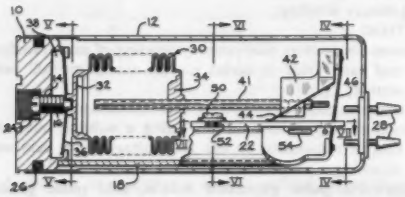


1. An electric switch comprising:
a housing comprising an insulating base having a switch compartment therein:
means on said housing supporting a switch operator;
a switch operator supported on said housing and having an actuator portion extending into said compartment for operating the switch contacts;
a rocking contactor disposed to be engaged by said actuator portion;
three spaced apart stationary contacts mounted in said base and connected to external terminals;
a flexible contactor secured to the first stationary contact and having a portion overlying the second stationary contact but biased away from the latter;
and means on said first and second stationary contacts supporting said rocking contactor for movement from a stable "off" position wherein it engages only said first stationary contact into a first stable "on" position wherein it presses said flexible contactor into engagement with said second stationary contact whereby to close one circuit and then into a second stable "on" position wherein it engages the third stationary contact while continuing to hold said flexible contactor against said second stationary contact to close two circuits.

4,023,000
DIRECT DRIVE SLIDING CONTACT TRANSDUCER

Claude C. Ankeny; Dean E. Gladow, and Charles E. Wierzbicki, all of Albuquerque, N. Mex., assignors to Sparton Corporation, Jackson, Mich.

Filed Sept. 2, 1975, Ser. No. 609,232
Int. Cl.² H01H *35/32*
U.S. Cl. 200—83 C 11 Claims

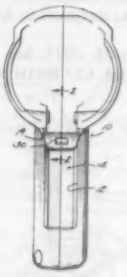


1. A pressure transducer comprising, in combination, a base, a bellows having an axis, a longitudinally expandable and contractable wall, a support portion and a pressure responsive movable portion, bellows mounting means mounting said bellows support portion upon said base, a circuit board mounted upon said base having electrical conducting portions defined thereon, means mounting said circuit board on said base for adjustment transverse to said bellows axis, a contact block directly connected to said bellows pressure responsive portion for movement therewith, said contact block being in direct alignment with said bellows axis, means supporting said contact block on said base for liner movement in a direction parallel to said bellows axis. means producing relative movement between said bellows and said circuit board for adjusting the relative positions thereof, and at least one electrical contact mounted upon said contact block slidably engaging said circuit board conducting portions whereby movement of said bellows pressure responsive movable portion directly translates said contact over said circuit board portions, in a linear movement, and an electric circuit connected to said circuit board portions.

4,023,001
LOCKING MEMBER FOR HAND-HELD TRIGGER ACTUATED SWITCH

Gary S. Lafferty, Sr., Franklin, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.

Filed Sept. 2, 1975, Ser. No. 609,242
Int. Cl.² H01H *9/06*
U.S. Cl. 200—157 4 Claims



1. The combination for the control of a portable electric tool comprising:
a. a pistol grip handle for said tool;
b. an ON and OFF trigger pivoted at one end in said handle and biased to OFF position, said trigger having a freely swingable non-pivoted end, said trigger having an outwardly facing face on and movable with said non-pivoted end; and
c. a spring biased pivotally mounted locking member supported independently of said trigger for locking said trigger in ON position, said locking member being positioned centrally of said trigger and said non-pivoted end and having an inwardly facing face.

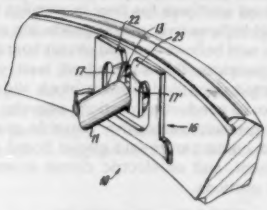
4,023,002
PUSHER AND SWITCH DEVICE FOR ELECTRONIC WATCH

Paul Wuthrich, Watertown, and Frank P. Mascia, Bristol, both of Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed Jan. 14, 1976, Ser. No. 649,114
Int. Cl.² H01H *3/12*; G04C *3/00*
U.S. Cl. 200—159 R 3 Claims

1. A pusher and switch assembly for an electronic watch having a module assembly and a case with an opening for access to the interior thereof, comprising:
a shaft movably mounted in said opening and having an interior end portion, a spring retainer section and an actuating end portion;
a switch blade mounted inside the case for axial engagement with the interior end portion of the shaft; and
spring means having a pair of separately protruding substan-

tially U-shaped arms forming an orifice to enable transverse insertion of said spring means into the case between the module assembly and the case for engaging the spring retainer section of the shaft which exerts axial bias on the



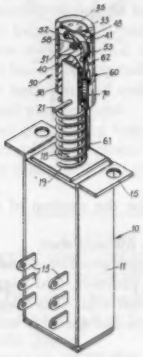
shaft for providing axial motion therto and outwardly extending portions contoured for mounting the spring means inside the case by spring pressure against the case and the module assembly for providing spring bias mounting and assembly of the spring means and the shaft.

4,023,003

POSITION INDICATING BUTTON FOR PUSH-PUSH SWITCH

Ronald H. Arthur, Fort Lauderdale, and Richard J. Dykinga, Miami, both of Fla., assignors to AMF Incorporated, White Plains, N.Y.

Filed May 28, 1975, Ser. No. 581,522
Int. Cl.² H01H 9/16
U.S. Cl. 200—308 **14 Claims**



1. Position indicator means for indicating the switching position of an electrical switch having a push rod adapted for axial motion between outermost and innermost switching positions, said indicator means comprising

an indicator housing,

an indicator element within said housing,

said indicator element having at least first and second indicia for indicating at least first and second switching positions of said switch,

viewing means in said housing for permitting the viewing of an indicium of the indicator element therethrough,

means within said housing for pivotally supporting said indicator element adjacent said viewing means to permit rotation of the indicator element and selective viewing of said indicia when the indicator element is in respective first and second viewing positions,

spring means within said housing for urging said indicator element to the first one of its viewing positions,

means on said housing for mounting the housing on said push rod of said electrical switch,

plunger means slidably received in said housing and slidable between first and second positions along a path that intersects said indicator element and that is parallel to the direction of motion of said push rod to which the indicator means is to be attached,

one end of said plunger means being free and extending to the exterior of said housing and adapted to contact, at least during inward motion of the push rod, stop means on a switch to which the housing is to be attached,

said plunger means adapted to slide from its first to its second position when its one end is in contact with said stop means and the push rod moves from its outermost to its innermost switching positions,

the opposite end of the plunger means being constructed and arranged to contact said indicator element at a location removed from its axis of rotation for rotating the indicator element from said first to said second viewing positions when the plunger means moves from its first to its second position, thereby to selectively expose said second indicia to said viewing means,

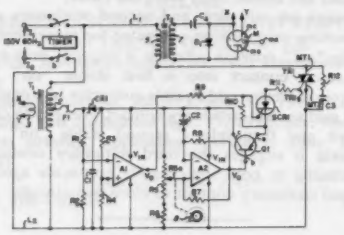
the length of said plunger means being proportioned to rotate the indicator element to its second viewing position when a push rod connected to the housing is in its innermost switching position and to permit said spring means to slide the plunger means to its first position and to return the indicator element to its first viewing position when the push rod is in its outermost switching position.

4,023,004

MICROWAVE OVEN POWER SUPPLY AND OSCILLATOR THEREFOR

Robert Virgil Burke, Fort Wayne, Ind., assignor to Litton Systems, Inc., Huntington, Ind.

Filed July 16, 1975, Ser. No. 596,439
Int. Cl.² H02B 9/06
U.S. Cl. 219—10.55 B **19 Claims**



1. An improved power supply for a microwave oven of the type which includes:

a high voltage transformer, said transformer having a primary winding and a secondary winding;

a magnetron;

means coupled to said secondary winding of said transformer and said magnetron for providing a DC current to said magnetron;

a primary winding;

a Triac;

means connecting said primary winding of said transformer and said Triac in series circuit across an AC voltage source;

the improvement comprising in combination:

synchronizing means for providing a voltage pulse at an output responsive to the AC voltage from said source attaining a predetermined instantaneous level;

adjustable pulse generator means, said pulse generator means for providing at an output a series of voltage pulses of a predetermined duration at a predetermined rate of occurrence, and adjusting means for simultaneously changing said pulse duration and said rate of occurrence thereof;

a positionable control member coupled to said adjusting means of said pulse generator means accessible to the

user for adjusting concurrently said pulse duration and said rate of occurrence thereof as a function of the position of said control member; and

gate means, said gate means responsive to each coincidence of an output pulse from said pulse generator means and a pulse from said synchronizing means for enabling said Triac to conduct current and responsive to the termination of each said output pulse from said pulse generator for permitting said Triac to restore to a noncurrent conducting state.

4,023,005

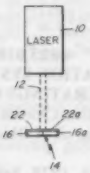
LASER WELDING HIGH REFLECTIVITY METALS

Stephen R. Bolin, Reading, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 21, 1975, Ser. No. 570,104

Int. Cl.² B23K *9/00*

U.S. Cl. 219—121 LM **16 Claims**



1. A method of welding a high reflectivity metal member by laser radiation comprising cladding a surface of the member with a layer of low reflectivity metal to a thickness of at least 0.0005 inch, directing a beam of coherent electromagnetic radiation from a laser through said layer into said member to melt the materials of the layer and member in the area contacted by the beam, removing said beam, and allowing the melted materials to solidify to form an integral weld nugget comprising an alloy of the materials.

4,023,006

PLASMA ARC WELDING METHOD

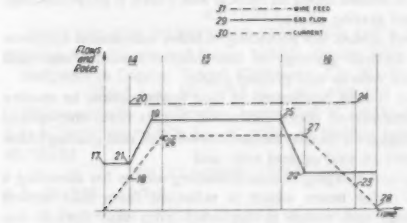
Richard West, and Donald Leslie Amos Weston, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, England

Division of Ser. No. 303,767, Nov. 6, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,174

Claims priority, application United Kingdom, Nov. 6, 1971, 51659/71

Int. Cl.² B23K *9/16, 9/10;* **H01J** *7/24*

U.S. Cl. 219—121 P **8 Claims**



1. A method of operating a plasma welding apparatus producing a plasma arc and having valve means arranged to control gas flow for the plasma arc, and power supply means arranged to control welding current for the plasma arc, comprising the steps of: providing a steady gas flow rate and welding current at a steady value during a welding run; reducing the gas flow rate, at a substantially constant rate, to a minimum value of the order of 30% of the steady flow rate at the conclusion of the welding run; and substantially subsequently reducing the plasma arc welding current, at a constant rate, from the steady value of welding current.

2. A method of operating a plasma welding apparatus according to claim **1**, the method further comprising the steps of: setting, at the start of the welding run, the gas flow rate at an initial value of the order of fifty per cent of the steady flow gas rate during the welding run; increasing the plasma arc welding current at a substantially constant rate to the steady value from an initial value sufficient to strike the plasma arc; and increasing the gas flow rate to the steady flow gas rate, at a substantially constant rate, as soon as the plasma arc has established a heyhole.

4. A method of operating a plasma welding apparatus according to claim **1**, further having a means for feeding a filler material to a weld, further comprising the step of: stopping the feed of filler material to the weld when the plasma arc welding current has been reduced to substantially 20% of the steady value of welding current.

4,023,007

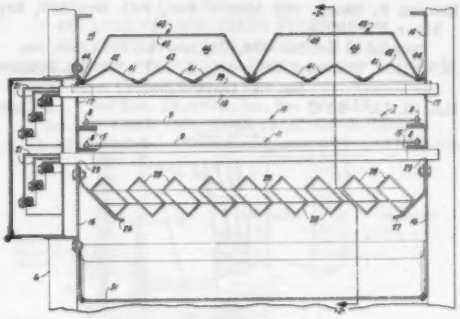
BROILER WITH AN ENDLESS BAR CONVEYOR

John S. Brown, Half Moon Bay, Calif., assignor to N.P.I. Corporation, Burlingame, Calif.

Filed June 28, 1976, Ser. No. 700,571

Int. Cl.² F27B *9/06*

U.S. Cl. 219—388 **8 Claims**



1. An electric broiler comprising a frame, an endless bar conveyor having an upper run and a lower run, means on said frame for supporting said upper run and said lower run in horizontal planes, upper electric heating rods, means on said frame for supporting said upper rods in a horizontal plane above said upper run, lower electric heating rods, means on said frame for supporting said lower rods in a horizontal plane below said lower run, means on said frame below said lower rods for baffling downward radiation, said baffling means including a plurality of spaced apart, hollow boxes, and means on said frame above said upper rods for reflecting upward radiation, said reflecting means including a plurality of dihedral plates.

4,023,008

TERMINAL CONNECTION FOR ELECTRIC HEATERS FOR VEHICLE WINDOWS

Philippe Durussel, Reny, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation of Ser. No. 428,715, Dec. 27, 1973, abandoned. This application May 30, 1975, Ser. No. 582,267

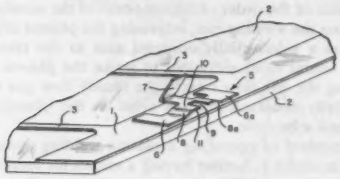
Claims priority, application France, Dec. 28, 1972, 72.46563

Int. Cl.² H05B *3/06*

U.S. Cl. 219—522 **3 Claims**

1. A terminal of a heater grid including conductive strips and bus bands made of a mixture of metallic powder and a frit baked to a rigid insulating support, said terminal comprising

two coplanar feet soldered to one of said bus bands, and a strip-shaped bridge portion joined with the feet by shoulder portions and displaced from the plane of said feet, a tab extending laterally from said bridge portion between said shoulder portions with the initial portion of the tab coplanar with



the bridge portion, the bridge portion directly between said shoulder portions and in direct lateral alignment with said initial portion of the tab having an opening passing completely therethrough to produce in said bridge portion a region of smaller lateral cross section than other regions of said bridge portion.

4,023,009

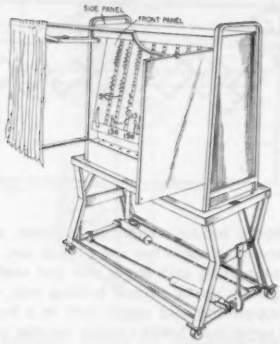
VOTING MACHINE WITH PRIMARY ELECTION SELECTION

Ransom F. Shoup, 400 Morris Ave., P.O. Box 389, Bryn Mawr, Pa. 19010

Division of Ser. No. 438,476, Jan. 31, 1974, Pat. No. 3,915,374. This application Aug. 5, 1975, Ser. No. 602,096

Int. Cl.² G07C *13/00*

U.S. Cl. 235—55 C **2 Claims**



1. In a voting machine of the type which includes columns of voting spindles,

a main interlock, pull straps connected to said spindles and engaging said interlock,

bell cranks having lugs thereon mounted for rotation on each of said voting spindles, and

ladder channels having a plurality of vertically spaced openings, the lug on each bell crank engaging a ladder channel at the top of one of said openings,

a selective primary mechanism comprising:

at least two party selector spindles each having a bell crank with a lug thereon, each lug engaging an associated ladder channel at the top and bottom of a small opening therein so that rotation of a party selector spindle to a nonvoting position acts through said ladder channels and bell cranks to clear said voting spindles of choices previously made but not voted,

means interconnecting columns of voting spindles in groups os that the ladder channels of each group are moved up and down in unison so that rotation any voting spindle in a group moves the ladder channels of that group upwardly in unison to permit voting by rotation of any voting spindle in that group,

a primary election interlock, and

pull straps connecting each group of columns to said primary election interlock, so that movement of one of said straps in a direction corresponding with an unlocking movement of a group of ladder channels immobilizes the other straps in said interlock and ladder channels connected thereto.

4,023,010

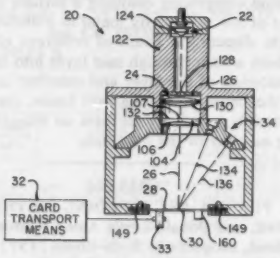
OPTICAL IDENTIFICATION SYSTEM AND READER FOR READING OPTICAL GRATINGS ON A RECORD MEDIUM

William R. Horst, Dayton; Charles F. Mort, Xenia, and William J. Hale, Kettering, all of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Sept. 8, 1975, Ser. No. 611,378

Int. Cl.² G06K *7/14, 19/06;* **G11C** *11/44;* **G02B** *5/18*

U.S. Cl. 235—61.11 E **14 Claims**



1. A reader for reading optical gratings on a record medium comprising:

a frame means for guiding a record medium with said optical gratings thereon in a grating plane in said reader;

light source means;

optical imaging means for directing light from said light source means along an optical axis which is perpendicular to said grating plane;

transport means for providing relative movement between said optical gratings of said record medium and said optical axis in said grating plane;

detector means positioned in said frame means to receive predetermined order diffracted beams from the optical gratings on a record medium moving in said grating plane relative to said optical axis; and

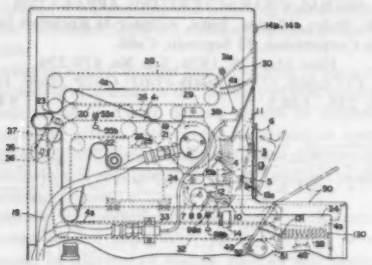
said optical imaging means including means for directing a zero order beam which is reflected from said optical gratings and which is displaced from said optical axis back to said grating plane to enable the resulting predetermined order diffracted beams diffracted from said optical gratings to be received at said detector means whenever a record medium is displaced slightly from said grating plane;

said means for directing said zero order beam including a spherically shaped mirrored surface whose center of curvature lies along said optical axis and also lies in said grating plane; said surface having an aperture located at said optical axis.

4,023,011
AUTOMATIC BANK NOTE DEPOSITING MACHINE

Shunichi Nakajima; Nobuo Kobayashi, and Yoshio Ariga, all of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed June 30, 1975, Ser. No. 591,315
Int. Cl.² G06K *17/00*
U.S. Cl. 235—61.11 R 6 Claims



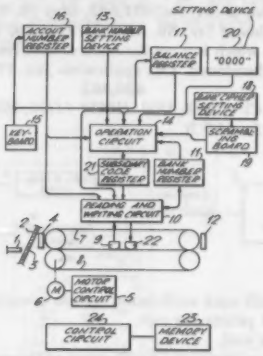
1. An automatic paper currency depositing machine comprising:
- a supply section for receiving paper currencies disposed substantially vertically;
- means for determining genuineness, validity and kind of each paper currency and the presence of overlapped paper currencies and providing an output signal in response thereto,
- means for singularizing the paper currencies disposed in said supply section and for serially transferring the paper currencies from said singularizing means to said determining means;
- a gate for sorting the paper currencies into fit, unfit and overlapped paper currencies in response to said signal provided by determining means;
- means for transferring each paper currency from said determining means to said sorting gate;
- a reject container;
- means for transferring the unfit and overlapped paper currencies sorted by said gate into said reject container;
- a storage section;
- means for transferring the fit paper currencies sorted by said gate into said storage section; and
- means for calculating the total amount of fit paper currencies.

4,023,012
SYSTEM FOR VERIFYING THE USER OF A CARD

Shizuya Ano, Kyoto, and Yasuo Uchida, Osaka, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed June 30, 1975, Ser. No. 591,465
Claims priority, application Japan, July 8, 1974, 49-78481; July 8, 1974, 49-78482; July 8, 1974, 49-78483; July 8, 1974, 49-78484
Int. Cl.² G06K *17/00, 7/00*
U.S. Cl. 235—61.7 B 14 Claims

1. A system for verifying the user of a card containing data comprising:
- A. means for obtaining data from said card;
- B. input means operable by the user of said card to input a secret number; and,
- C. checking means connected to receive said data from said card and said secret number for:
  1. manipulating said data read from said card to obtain derived data;
  2. checking whether said derived data includes predetermined specific data; and,
  3. recognizing said user as the proper user of said card if said predetermined specified data is found to exist,

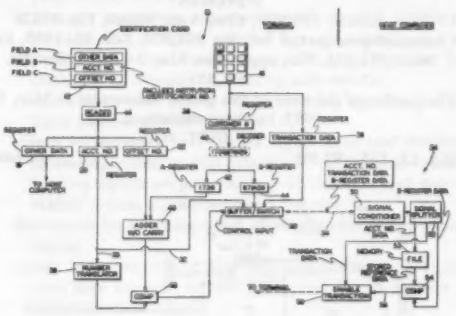


regardless of whether correspondence exists between said derived data and said secret number.

4,023,013
ON-LINE VERIFICATION SYSTEM FOR IDENTIFICATION CARD OR THE LIKE

Donald E. Kinker, North Canton, Ohio, assignor to Diebold, Incorporated, Canton, Ohio

Filed Dec. 29, 1975, Ser. No. 644,559
Int. Cl.² G05B *1/03;* G06F *15/02;* G06K *7/00*
U.S. Cl. 235—61.7 B 17 Claims



1. In an on-line system including a central computer and at least one remote terminal, an apparatus for verifying that a holder of an identification card bearing machine-readable data is an authorized holder, comprising means for converting said machine-readable data into a first electrical signal; means for entering a set of indicia known by only the authorized holder; means for converting said set of indicia into first and second signal portions; first means located at the remote terminal for comparing said first signal portion with a first reference signal; means responsive to a favorable comparison in said first means for generating a first validation signal; means responsive to the first validation signal for transmitting said second signal portion to the central computer; second means located at the central computer for comparing said second signal portion with a second reference signal; and means responsive to a favorable comparison in said second means for generating a second validation signal indicating that the holder of the card is an authorized holder.

4,023,014

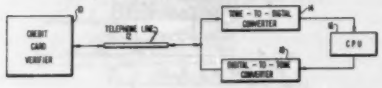
CREDIT CARD VERIFIER

Kenneth M. Goldberg, 361 Main St., Malden, Mass. 02148

Continuation of Ser. No. 471,693, May 20, 1974, which is a continuation of Ser. No. 210,272, Dec. 20, 1971, Pat. No. 3,823,308, which is a continuation of Ser. No. 880,265, Nov. 26, 1969, abandoned. This application Jan. 19, 1976, Ser. No. 650,463

Int. Cl.² G06K *5/00;* **H04M** *11/00;* **H03Q** *3/00*

U.S. Cl. 235—61.7 B **1 Claim**



1. A credit card verification system comprising:

a central processing unit,

a verifier unit,

means connecting the verifier unit to the central processing unit,

the verifier unit comprising a plurality of signal generators for manually and sequentially generating and transmitting to the central processing unit signals representative of an account to be verified,

the central processing unit comprising means for generating and transmitting to the verifier unit a signal representative of the status of the account to be verified,

the verifier unit further comprising means for receiving the signal representative of the status of the account to be verified and means for indicating the status of the account to be verified.

4,023,015

OPERATION COUNTER FOR POWER TAKE-OFF CLUTCHES ASSOCIATED WITH WRECKER HOISTING WINCHES

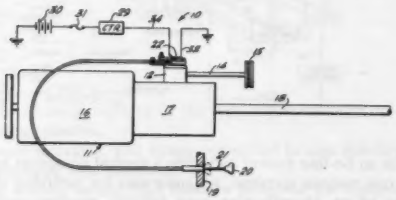
Uville A. Garcia, 130 NW. 62nd Ave., Miami, Fla. 33126

Continuation-in-part of Ser. No. 551,524, Feb. 21, 1975, Pat. No. 3,951,634. This application May 24, 1976, Ser. No. 689,531

The portion of the term of this patent subsequent to Mar. 16, 1993, has been disclaimed.

Int. Cl.² G07C *3/10*

U.S. Cl. 235—92 PD **2 Claims**



1. In a mechanical operation counter for use in association with a cable-controlled, lever-actuated power take-off clutch for controlling the operation of a mechanical device, wherein the lever is movable back and forth by a cable connected with one end of the lever, and the other end of the lever is fixed to an actuating member rotatably journalled in the power take-off clutch housing and extending outwardly of a side wall cover comprising said housing, the improvement comprising a normally open-circuit electrical switch means fixed with respect to said side wall cover and cam means fixed with respect to the pivotal end of the lever for movement in unison therewith about a common rotative axis and operative to momentarily close circuit said switch means upon movement of the lever in one direction or the other by use of the cable, said switch means being a micro-switch having a switch actuating button, and said cam means being in the form of a rotary disc having a plurality of radially-extending lobes adjustably fixed with respect to the lever for selectively placing one of said lobes in actuating position with respect to said switch actuating button.

4,023,016

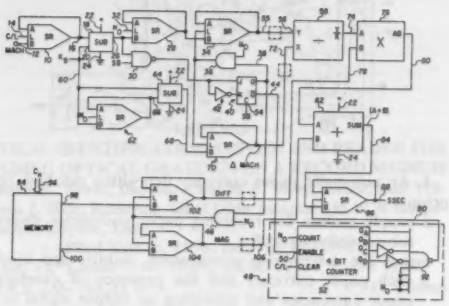
SIGNAL CHARACTERIZING APPARATUS

Lewis E. Staley, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 25, 1976, Ser. No. 670,334

Int. Cl.² G06F *15/34;* **B64D** *43/02;* **G01P** *21/00, 3/50*

U.S. Cl. 235—150.2 **5 Claims**



1. Signal generating means comprising, in combination:

first means for supplying a first signal indicative in magnitude of a variable parameter;

second means for supplying a second signal comprising a first series of predetermined and periodically recurring magnitudes;

third means, connected to said first and second means, for providing an output third signal indicative of the last difference between said first and second signals prior to the time when the relative magnitude of said first signal with respect to the second signal changes sign;

fourth means for supplying a fourth signal from a second series of predetermined and periodically recurring magnitudes simultaneous with the occurrence of said third signal;

fifth means for supplying a fifth signal from a third series of periodically recurring magnitudes indicative of the difference between time adjacent magnitudes of said second series of magnitudes simultaneous with the occurrence of said third signal;

sixth means for supplying a sixth signal from a series of periodically recurring magnitudes indicative of the difference between the present magnitude of said first series of magnitudes and the previous magnitude thereof simultaneous with the occurrence of said third signal;

seventh means, connected to said third, fourth, fifth and sixth means, for multiplying the ratio of said third and sixth signals times said fifth signal and adding thereto the fourth signal whereby a resultant seventh signal output is obtained.

4,023,017

ELECTRONIC TRAFFIC CONTROL SYSTEM

Pierluigi Ceseri, Florence, Italy, assignor to Autostrade, S.p.A., Rome, Italy

Filed May 21, 1975, Ser. No. 579,405

Claims priority, application Italy, May 28, 1974, 51264/74

Int. Cl.² G06F *15/48*

U.S. Cl. 235—150.24 **24 Claims**

1. An electronic traffic control system for monitoring a

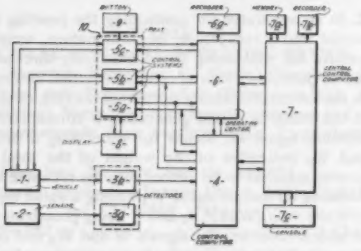
stretch of road and permitting two directional transmissions both in code and in clear between an operating center and vehicles located on the stretch of road comprising:

a plurality of detectors positioned in spaced apart relationship along said stretch of road for detecting traffic information and highways conditions;

a plurality of post circuit means, each post circuit means respectively interconnecting a different group of said detectors, each of said post circuit means including means for transmitting and receiving signals from each of the individual detectors constituting that group of detectors;

a radiating system divided into a plurality of sections corresponding in number to the plurality of post circuit means, one section for each of said groups of detectors, said radiating system including a transmission system and receiving and transmitting apparatus positioned respectively in said post circuit means and coupled to said transmission system,

a plurality of control computer means, each control computer means respectively interconnecting a different group of post circuit means, each of said control computer means capable of receiving the detected information from each post circuit means within that group of post circuit means and in response thereto calculating the anticipated traffic information at each of the other post



circuit means within that group, comparing the anticipated traffic information with the actual detected information at each of the other post circuit means and upon detecting differences greater than predetermined threshold providing an alarm signal;

visual displays positioned along said stretch of road under control of said alarm signal;

signal devices adapted to be inserted within vehicles utilizing said stretch of road and being activated under control of said alarm signal;

each of said control computer means also controlling the sections of said radiating system within that group of post circuit means to transmit in clear prerecorded messages, specific messages both in code and in clear, and broadcast programs;

an operating center coupled to said control computer means for setting the controls desired on the stretch of road;

a central computer interconnecting said control computer means for providing instructions to each of said control computer means concerning said thresholds and other information, and for storing information regarding the performance of each of said control computer means; and

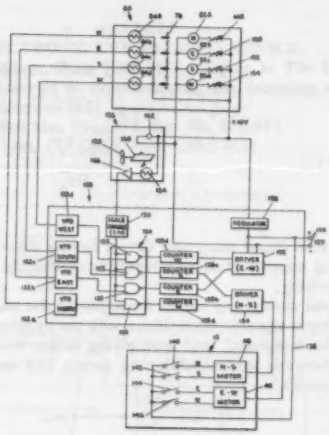
a manually operated device attached to each of said post circuit means for transmitting code messages to said operating center.

4,023,018

NAVIGATION SYSTEM AND METHOD

David J. Hall, 18104 Lovell Road, Spring Lake, Mich. 49456

Filed July 15, 1975, Ser. No. 596,183
Int. Cl.² G01S 7/44; B63H 25/00
U.S. Cl. 235—150.27 12 Claims



1. A navigation system for determining the position of an air, land or water vehicle with respect to a given set of coordinates, said system comprising:

means for measuring the heading of said vehicle with respect to two intersecting directions and for generating output signals representative of the vehicle heading in each of said two directions;

a distance measuring means mounted on said vehicle to measure the distance traveled by said vehicle and to produce an output sample signal of a given duration for each unit of distance traveled by said vehicle;

means to gate each of said vehicle heading signals when an input pulse is applied thereto;

means for applying said sample signal from said distance measuring means to said gate means so that said vehicle heading signals are gated for a given duration each time a vehicle travels a predetermined distance;

first means for summing a first gated signal from said gating means;

means for producing a first directional command signal each time the sum of said first gated signals reaches a predetermined value;

second means for summing a second gated signal from said gating means;

means for producing a second directional command signal each time the sum of the second gated signals reaches a predetermined value;

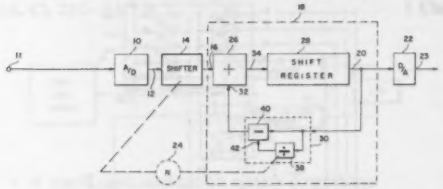
visual indicator means for visually indicating the position of said vehicle with respect to a given set of coordinates, said indicator means including means coupled to said first directional comamand signal producing means for counting the number of signals generated and for visually indicating the number of said first directional command signals; and;

means coupled to said second directional command signal producing means for counting the number of signals generated thereby and for visually indicating the number of said second directional command signals.

4,023,019
AUTOMATIC SCALED DIGITAL INTEGRATOR

Lawrence M. Leibowitz, Fairfax, Va., and Phillip L. Watkins, Rockville, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 23, 1974, Ser. No. 508,786
Int. Cl.[2] G06F 7/38; G06G 7/18
U.S. Cl. 235—150.51 5 Claims



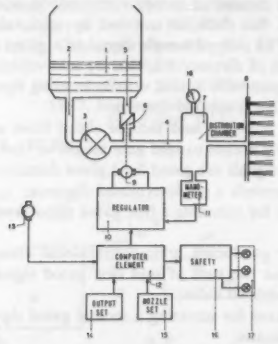
1. In a digital integrator device having input signal conditioning means and signal integrating means, the improvement comprising:

signal multiplying means for adjusting the magnitude of an input signal in accordance with the number of signals to be integrated, said multiplying means being connected between said conditioning means and said integrating means.

4,023,020
WHEELED VEHICLE WITH CONTROLLED-OUTPUT SPREADER SYSTEM

Maurice C. J. Lestradet, 291 rue du Marechal Delattre de Tassigny, Fere Cahmpenoise, France (51230)

Filed Apr. 4, 1975, Ser. No. 565,118
Claims priority, application France, Apr. 4, 1974, 74.12009
Int. Cl.[2] G06G 7/50; B05B 9/06
U.S. Cl. 235—151.2 12 Claims



1. In a vehicle-carried spreader system which includes a reservoir for the material to be spread, a distribution chamber connected to the outlet of the reservoir, return connection means from the outlet back to the reservoir, valve means regulating the flow of the material in the return connection means and means for measuring the pressure in the distribution chamber,

the improvement which comprises:

input means for setting in the desired value of spreader output and for setting in a value characteristic of spray nozzles used by the spreader system;

means for measuring vehicle speed;

means for utilizing the set-in values and measured speed to produce a reference value;

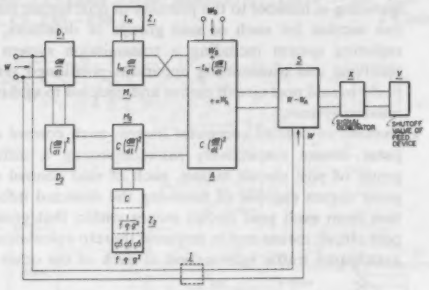
means for comparing the reference value with the measured pressure; and

means for controlling the valve means in accordance with the comparison.

4,023,021
METHOD AND APPARATUS FOR WEIGHING BATCHES OF LIQUID AND OTHER POURABLE SUBSTANCES

Konrad Kuschel, Vienna, Austria, assignor to IFE Gesellschaft mbH, Vienna, Austria

Filed Apr. 7, 1975, Ser. No. 566,615
Claims priority, application Austria, Apr. 8, 1974, 2935
Int. Cl.[2] G01G 17/06; G06F 15/46
U.S. Cl. 235—151.33 14 Claims



2. In an apparatus for controlling the pouring of pourable material into a receptacle, in combination, weighing means operative for measuring the downwardly directed force exerted by pourable material contained within and being poured into the receptacle during the actual pouring of such material into the receptacle and generating a corresponding weight-indication signal W; means for generating a desired-weight signal W_S indicative of the weight of the total amount of pourable material to be poured into the receptacle; means for generating an output signal W_A having a value equal to $W_S - t_N(dW/dt) + C(dW/dt)^2$, t_N and C being preselected constants; and means receiving the signals W and W_A and operative for automatically terminating the further pouring of such material into the receptacle when the signals W and W_A become equal in value.

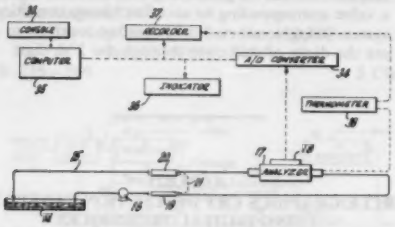
4,023,022
SYSTEM FOR AUTOMATICALLY AND CONTINUOUSLY MEASURING ZINC AND SULFURIC ACID CONCENTRATION IN CIRCULATING ELECTROLYTE

Satoshi Mukae, and Kiyosi Yokokawa, both of Shimonoseki, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed July 22, 1975, Ser. No. 598,032
Claims priority, application Japan, Aug. 5, 1974, 49-89582; Aug. 20, 1974, 49-99431[U]
Int. Cl.[2] G01N 27/56, 33/20; G06F 15/20
U.S. Cl. 235—151.35 4 Claims

1. A system for automatically and continuously measuring the zinc and sulfuric acid concentration in an electrolyte circulating through an electrolysis cell in a hydromentallurgical zinc production process, said measuring system comprising an inductive solution analyzer having a transmitter and capable of continuously detecting the conductivity of the circulating electrolyte, and a measuring cell disposed in the path of a continuous stream of the circulating electrolyte, said measuring cell comprising a defoaming chamber, a measuring chamber and an overflow chamber defined therein by a partition wall, said transmitter of said inductive solution analyzer being disposed within said measuring chamber, an overflow port formed in an upper portion of said partition wall and a first communication port bored in a middle portion of said partition wall to provide communication means between said de-

foaming chamber and said measuring chamber, and a second communicating port bored in a lower portion of said partition wall to provide communication means between said measuring chamber and said overflow chamber, whereby the circulating electrolyte can always flow through said measuring cell as a downward stream.

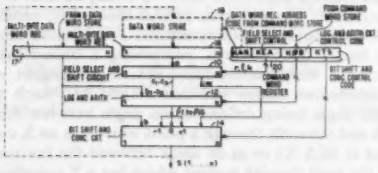


4,023,023

FIELD SELECTION DATA OPERATING DEVICE

Jean-Marie Bourrez, Versailles; C. Nessin Chemla, Saint-Cloud; Jean-Louis Fressineau, Les Clayes-sous-Bois, and Maurice Hubert, Versailles, all of France, assignors to Compagnie Internationale pour l'Informatique, Louveciennes, France

Filed Nov. 27, 1974, Ser. No. 527,871
Claims priority, application France, Dec. 4, 1973, 73.43136
Int. Cl.² G06F *15/30*
U.S. Cl. 235—152 **5 Claims**



4. Data word apparatus for processing data words, comprising:

a. a field selector and shifter circuit controlled by a field length code, a shift value code and a first bit rank code;

b. a logical and arithmetical operator circuit controlled by an operation code for combining the output of said field selector and shifter circuit with another data word; and

c. a bit shifter and concatenator circuit having control inputs and being controlled by a command code for selectively shifting and concatenating the bits of a data word derived from said logical and arithmetical operator circuit,

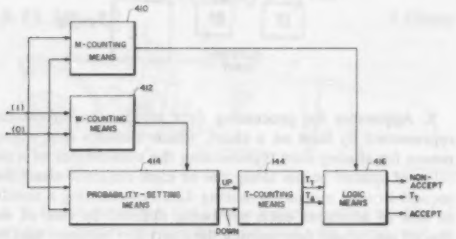
d. said field selector and shifter circuit comprising two cascade-connected stages of multiplexer circuits, said first stage shifting the bytes of the applied data word according to the shift value code and the first bit field rank code, said second stage completing the shift according to said rank and applying a mask to bits derived from its outputs according to the field length code, said mask being further applied to said control inputs of said bit shifter and concatenator circuit.

4,023,024

ELECTRONIC URN DECISION DEVICE

Walton B. Bishop, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 19, 1975, Ser. No. 578,952
Int. Cl.² G06F *7/38*; G01S *9/56*
U.S. Cl. 235—152 **5 Claims**



1. A decision device for making probabilistic decisions regarding the most recent set, W, of a series of binary 1 and 0 sample signals comprising, in combination:

terminal means for connection to separate sources of binary 1 and 0 sample signals;

W-counting means for counting the total number of 1 and 0 sample signals received and providing an output signal when the total exceeds a preselected number, W;

T-counting means for receiving a continuing series of binary 1 and 0 signals and converting them to a number of output signals, T_i, where i is a number from 1 to a preselected value A, T_A corresponding to a probability value of 1's relative to the number of 1's and 0's in said T-counting means which has been selected as the probability level at which an Accept decision will be made;

probability-setting means, connected to said terminal means, said W-counting means and said T-counting means, said probability-setting means including special-purpose, pseudorandom, binary-sequence-generator means, for causing the count of said T-counting means, after the W-counting means has reached a count of W, to be reduced by one unit with a probability of T_i/W if the received input binary sample is a 0, and to be increased by one unit with a probability of $W\text{-}T_i/W$ if the received input binary sample is a 1;

M-counting means, connected to said terminal means, for counting said 1 and 0 samples and producing an output signal when the total number of 1's and 0's becomes equal to M, a preselected binary number related to the maximum number of samples to be considered before a NON-Accept decision is made, M being a number greater than the number W;

logic means, connected to receive the output signal of said M-counting means and the T_A output signal of said T-counting means, for generating a Non-Accept output signal whenever said M-counting means reaches a count of M before said T-counting means reaches a count of T_A and for generating an Accept signal whenever said T-counting means reaches a count of T_A before said M-counting means reaches a count of M.

4,023,025

APPARATUS FOR PROCESSING DATA RELATING TO INFORMATION REPRESENTED BY LINES ON A CHART

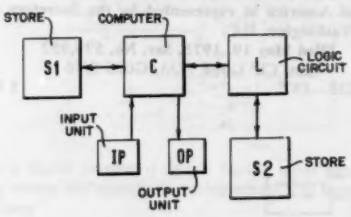
Barry Rowe, Wokingham, and Harold Frank Rymer, Twyford, both of England, assignors to Ferranti, Limited, Hollinwood, England

Filed Nov. 5, 1975, Ser. No. 629,126

Claims priority, application United Kingdom, Nov. 9, 1974, 48612/74

Int. Cl.² G09B *9/00*

U.S. Cl. 235—152 **5 Claims**



1. Apparatus for processing data relating to information represented by lines on a chart, which includes first storage means for storing data representing the coordinates of a plurality of spaced points along the or each required chart line, second storage means for storing data representing a number of sets of elements each set being defined by one of said spaced points and determining the chart line between said one point and the next, computer means operably connected to the first storage means for identifying the or each spaced point relating to a particular chart line and within a predetermined area around a point of interest on the chart, and logic means connected to the computer means and to the second storage means and operable to determine which elements in each set defined by an identified spaced point approach within said predetermined area around said point of interest.

4,023,026

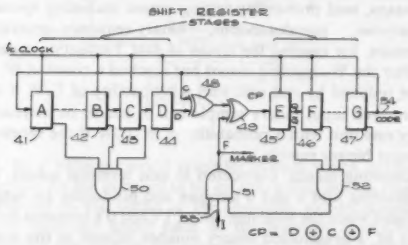
PSEUDO-RANDOM CODER WITH IMPROVED NEAR RANGE REJECTION

Francis J. O'Farrell, Valencia, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,640

Int. Cl.² G06F *1/02*

U.S. Cl. 235—152 **10 Claims**



1. A system for generating a maximum length pseudo-random code, including digital word means for generating a repetitive serial digital word of L bits as a psdueo-random sequence, where $L = 2^n$ and n = the number of stages in said digital word means, each of said stages being capable of assuming a first or second binary condition, the combination comprising:

first means connected to respond to said binary condition of a predetermined number of said stages to produce an identifying signal for the instantaneous code condition corresponding to the presence of the $(n-1)$th successive contiguous digit having a value corresponding to said first binary condition;

and second means responsive to said identifying signal from said first means, for generating the next code digit having a value corresponding to said first binary condition, said system being connected to thereafter continue to generate the digits of said code through the 2^nth digit.

4,023,027

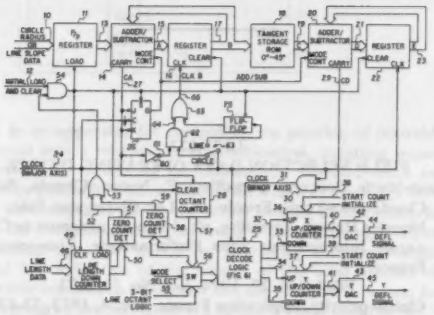
CIRCLE/GRAPHICS CRT DEFLECTION GENERATION USING DIGITAL TECHNIQUES

Lyle R. Strathman, Cedar Rapids; Robert A. Bolin, Marion; Vincent B. Collins, and Ronald L. Swanson, both of Cedar Rapids, all of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 10, 1975, Ser. No. 630,389

Int. Cl.² G06F *3/14*

U.S. Cl. 235—152 **6 Claims**

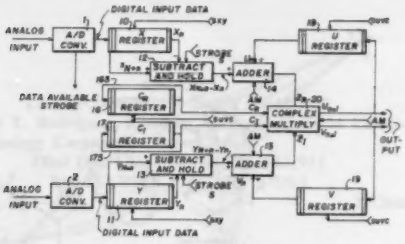


1. A digital system for developing in respective digital up/down counters, counts indicative respectively of X and Y deflection signals for a cathode ray tube beam to cause the beam to successively deflect to points on a line of predetermined slope comprising, a source of clock pulses, a first binary adder means for developing a cumulative total of successive inputs thereto and having a carry output exhibiting a predetermined discrete logic level when the binary number in said first binary adder is equal to or greater than unity; means for repeatedly inputting a binary number at said clock rate to said first binary adder means, comprising a binary memory in which are stored addressable successive tangent values of predetermined angles between 0° and 45°, each predetermined angle being defined as an angle between the vertical radii and the radii through a point which has an X coordinate equal to $N(\Delta X)$ or as an angle between the horizontal radii and the radii through a point which has a Y coordinate equal to $N(\Delta Y)$, where ΔX and ΔY are equal constants and where N varies between zero and a predetermined maximum number of angles, and memory addressing means for repeatedly addressing said binary memory at said clock rate to read out an addressed one of said tangent values; coincidence gating means responsive to said clock pulses and the carry output of said first binary adder means to pass those of said clock pulses time coincident with the occurrence of said predetermined logic level of said first binary adder means carry output to a second clock line; and a logic means receiving said clock pulses and those of said clock pulses on said second clock line and a predetermined code word definitive of that one of eight contiguous octants of 360° within which said line lies to route said clock pulses and those of said clock pulses on said second clock line to respective individual ones of the up and down count input terminals of said X and Y counters.

4,023,028
METHOD AND APPARATUS FOR COMPUTING THE DISCRETE FOURIER TRANSFORM RECURSIVELY

George M. Dillard, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 20, 1974, Ser. No. 498,888
Int. Cl.² G06F *15/34*
U.S. Cl. 235—156 5 Claims



1. An apparatus for computing the discrete Fourier transform of a waveform comprising:

input register means for receiving a series of digital data samples representative of said waveform;

subtract and hold means connected to said input register means for subtracting the oldest data sample stored in said input register from the newest data sample stored in said input register means;

an adder network connected to the output of said subtract and hold means;

a multiplier network having a first input connected to the output of said adder network and having a second input;

constants storage means connected to said second multiplier network input for outputting to said multiplier network a series of predetermined digital constants;

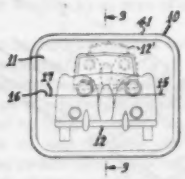
output register means having an input connected to said multiplier network and an output connected to said adder network second input;

timing means for gating said input and output register means, said subtract and hold means, said adder network, said multiplier network and said constants storage means at predetermined intervals.

4,023,029
DISTANCE INDICATING MIRROR DEVICE

Kenneth J. Fischer, 6595 San Juan Ave., Apt. 31, Jacksonville, Fla. 32210

Filed Oct. 28, 1975, Ser. No. 625,834
Int. Cl.² F21V *33/00*; G02B *5/10*
U.S. Cl. 240—4.2 9 Claims

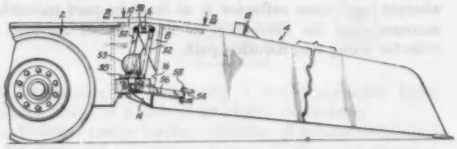


1. A distance indicating mirror device for attachment to a passing vehicle comprising a convex mirror for reflecting an image of a passed vehicle, a housing for supporting said mirror, said housing having a chamber therein partially defined by the reflective surface portion of said mirror, and indicia means on said mirror and viewable outwardly of said mirror for indicating a predetermined safe distance between a passing and a passed vehicle whereby a passing vehicle may relatively safely pull over in front of an immediately passed vehicle, said indicia means including a non-reflective surface portion of the otherwise reflective surface of said mirror located at a light transmitting predetermined horizontal position on said mirror when attached to a passing vehicle above which the image of a passed vehicle will be reflected when said predetermined safe distance is achieved, illuminating means disposed within said chamber for emitting light, and a colored filter between said non-reflective surface portion and said illuminating means for passing colored light through said non-reflective surface portion of said mirror.

4,023,030
HEADLIGHT MOUNT FOR MINE VEHICLE

John J. Teti, P.O. Box 756, Saltville, Va. 24370

Filed Sept. 22, 1975, Ser. No. 615,165
Int. Cl.² B60Q *1/32*
U.S. Cl. 240—8.2 5 Claims



1. A headlight mount for a mine vehicle having a wheeled body and a transverse member, provided with a rear wall, at the front thereof, said headlight mount comprising:

a support on the rear wall of said transverse member and having a first position extending laterally outwardly thereof;

a headlight mounted on said support adjacent the outer end thereof and arranged to direct a light beam forwardly alongside an end of said member;

said support being mounted for inward movement to a second position with said headlight behind said member;

biasing means urging said support outwardly to said first position;

means connected to said support and positioned to engage any obstruction adjacent the path of movement of said vehicle and move said support to its second position in response to forward movement of said vehicle along said obstruction;

said support being slidably mounted on a frame for movement between said first and second positions, said frame being mounted on said rear wall for tilting about a laterally extending axis; and

parallel linkage means connecting said frame and said wheeled body to maintain said light beam in substantially fixed orientation relative to said wheeled body irrespective of tilting of said member.

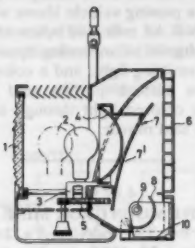
4,023,031
LUMINAIRE

Stanley Herbert Storey, Norwich, England, assignor to Berkey Photo, Inc., New York, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,343
Claims priority, application United Kingdom, July 24, 1975, 30962/75
Int. Cl.² F21V *19/04*
U.S. Cl. 240—37 8 Claims

1. A luminaire comprising in combination a Fresnel spot-light assembly and a flood-light assembly, said luminaire including a housing having a Fresnel lens at one end and a floodlight diffuser at the other end, said Fresnel assembly including a carriage, a reflector mounted on said carriage and movable along a focusing path toward and away from said Fresnel lens for focusing the Fresnel spot-light and a lamp mounted on said carriage between said lens and reflector, said

flood-light assembly including a main reflector normally mounted in operative position relative to said flood light diffuser and a flood-light lamp mounted between said main reflector and said flood-light diffuser, said focusing path extend-



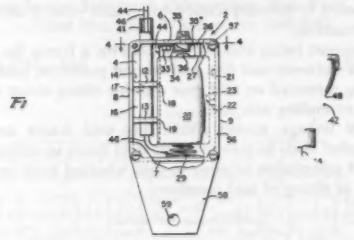
ing through the operative position of said main reflector, and wherein said main reflector is at least in part movable to accommodate the movement of said Fresnel carriage and reflector along said focusing path.

4,023,032

LIGHT STANDARD FOR BICYCLES

Jack E. Taylor, deceased, late of San Jose, Calif., and Carol L. Taylor, administratrix, 376 Los Pinos Way, San Jose, Calif. 95123

Filed Nov. 18, 1974, Ser. No. 524,803
Int. Cl.² B62J *5/00*
U.S. Cl. 240—58 **3 Claims**



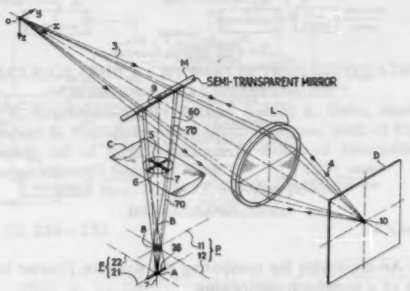
1. A safety standard for a bicycle comprising:
a. a housing assembly adapted to be detachably secured to the rear axle of a bicycle wheel;
b. an elongated and resiliently flexible staff having an integral end portion extending into and anchored in said housing assembly;
c. an energizable light assembly mounted on the other end of said staff remote from said housing assembly; and
d. means carried within said housing assembly to selectively energize said light assembly;
e. said housing assembly comprising a generally hollow box-like structure including a face and end and side walls, gussets associated with one of said side walls, said gussets and one of said end walls being provided with apertures through which the associated end of said staff extends and to which said staff is securely anchored.

4,023,033

OPTICAL FOCUSSING DEVICE

Claude Bricot, and Jean Claude Lehureau, both of Paris, France, assignors to Thomson-Brandt, Paris, France

Continuation of Ser. No. 540,943, Jan. 14, 1975, abandoned. This application Sept. 29, 1976, Ser. No. 727,803
Claims priority, application France, Jan. 15, 1974, 74.01283
Int. Cl.² G01J *1/20*
U.S. Cl. 250—201 **7 Claims**



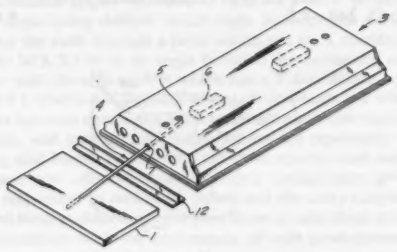
1. A device for focussing a read-out light beam onto the reflective surface of a moving data carrier, said device comprising an objective lens which causes the read-out beam to converge upon said reflective surface, optical guidance means for guiding, towards an observation plane, a reflected beam consisting of at least one fraction of said read-out beam reflected by said reflective surface; optical means arranged in the path of one of said beams for introducing astigmatism on the optical axis of said objective lens; said reflective surface and said observation plane being located respectively in first and second imaging planes; said beams respectively projecting first and second light spots in said first and second imaging planes; photodetector means being positioned in said observation plane for detecting the shape of the second of said light spots; said photodetector means producing a control signal, controlling the focussing of said read-out beam.

4,023,034

LIGHT ADMITTING MEANS FOR PHOTOCELL-CONTROLLED LIGHTING FIXTURE

Ezra L. Schacht, P.O. Box 8367, Houston, Tex. 77004

Filed Sept. 8, 1975, Ser. No. 611,524
Int. Cl.² G02B *5/14*
U.S. Cl. 250—227 **1 Claim**



1. Light-admitting means for recessed-troffer lighting-fixture, comprising:
photocell-controlled relay within said lighting fixture compartment;
cutting-edged coring tube having driving means for penetrating a ceiling;

light-admitting conduit having light-impervious sheath of diameter smaller than inner diameter of said coring tube; and

optical coupling means from said light-admitting conduit to said photocell-controlled relay.

4,023,035

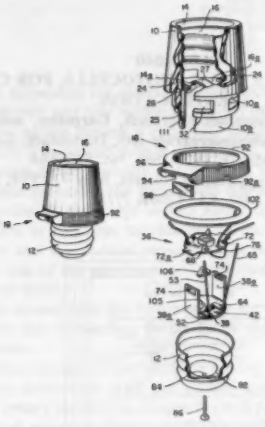
LIGHT SENSITIVE LAMP ADAPTER

Edward T. Rodriguez, Reading, Mass., assignor to Creative Technology Corporation, Salem, Mass.

Filed Dec. 12, 1974, Ser. No. 531,911

Int. Cl.² H05B *37/02;* **H01J** *5/02*

U.S. Cl. 250—239 **1 Claim**



1. A light-sensitive lamp adapter comprising

A. an opaque housing having first and second ends and a first cavity opening into the first end,

B. a lamp socket shell positioned in said cavity,

C. a lamp base having a base shell and secured to the second end,

D. means electrically interconnecting the shells,

E. first and second center contacts in the bottoms of said socket and base shells, respectively,

F. means defining a plurality of fixed windows in the housing distributed in a circle all around the longitudinal axis of the housing, at least one said window being separated from an adjacent window by an area of said opaque housing,

G. a switch in the housing connected for conduction between the center contacts,

H. a photocell positioned in the housing adjacent the fixed windows and fixed to said housing, said photocell aligned to be illuminated by light from any direction about the longitudinal axis of said housing, for controlling the switch so that the switch turns on or off depending upon the intensity of the light incident on the photocell, and

I. movable window means rotatively mounted on the housing for movement in a circle all around said axis for selective alignment with any one of the fixed windows so that ambient light from any given direction can be incident on the photocell, the area of said movable window being no greater than said opaque housing area so that when said movable window is aligned with said opaque area no light reaches said photocell.

4,023,036

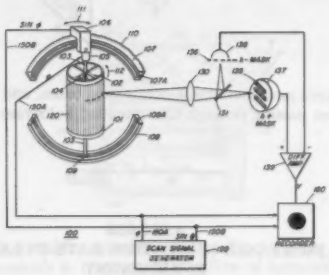
APPARATUS AND METHOD FOR TRANSVERSE TOMOGRAPHY

Harrison H. Barrett, and Scott Gordon, both of Tucson, Ariz., assignors to University Patents, Inc., Stamford, Conn.

Filed June 16, 1975, Ser. No. 587,352

Int. Cl.² H01J *39/12;* **G01N** *23/04*

U.S. Cl. 250—237 R **30 Claims**



10. Apparatus for generating a two-dimensional back-projected image of a slice of an object, comprising:

a cylindrical carrier having a plurality of substantially parallel elongated projections thereon in the axial direction, each projection having an optical characteristic representing the density characteristic of said slice of the object as measured at a particular rotational angle;

means for uniformly illuminating said carrier;

optical mask means spaced from said cylindrical carrier and operative to image portions of projections on said cylindrical carrier;

means for rotating said cylindrical carrier on its axis whereby said mask means continuously images different groups of projections on said cylindrical carrier;

means for effecting relative angular motion between said mask means and the axis of said cylindrical carrier whereby said mask means images varying portions of said cylindrical carrier, the variations being along the axial direction thereof;

photodetector means responsive to the image viewed through said mask means; and

display means responsive to the output of said photodetector means for displaying the back-projected image of said slice.

4,023,037

DECODING COMPOSITE IMAGES OF THREE-DIMENSIONAL OBJECTS BY CONVOLUTION

Hermann Weiss, Hamburg, and Erhard Klotz, Halstenbek, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,016

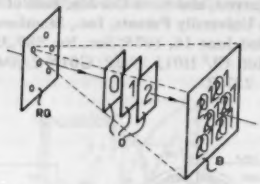
Claims priority, application Germany, Mar. 25, 1974, 2414322

Int. Cl.² G03C *9/00;* **G03H** *1/00*

U.S. Cl. 250—313 **6 Claims**

1. A method of encoding and decoding composite images of three-dimensional objects comprising recording a three dimensional object with radiation from a large number of radiation sources of different perspective, exposing a holographic recording medium to a coherent reference wave having a plane wave front and simultaneously illuminating with a converging coherent beam a shadow mask provided with holes having coordinates corresponding to an image of the distribution of said radiation sources recorded by a pinhole camera and exposing said holographic recording medium to the radiation passing through said shadow mask thereby producing a coded point hologram, illuminating the coded point hologram with a converging beam of incoherent monochromatic radia-

tion through the recording of said object, shifting the recording of said object with respect to the point hologram in said



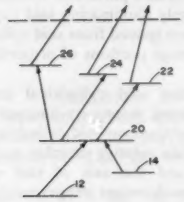
incoherent monochromatic converging beam, and imaging the radiation passing through said decoded hologram.

4,023,038

INCREASED IONIZATION RATE IN LASER ENRICHMENT

George Sargent Janes, Lincoln, and Charles T. Pike, Lexington, both of Mass., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed Sept. 19, 1974, Ser. No. 507,583
Int. Cl.² H01J *39/34*
U.S. Cl. 250—423 P **25 Claims**



1. A method for increasing the number of selectively excited particles available for ionization in an environment comprising the step of:

applying electromagnetic energy to an environment of particles of plural isotope types including particles of one isotope type to excite and distribute the particles of the one isotope type to a plurality of distinct energy levels below the ionization level for the particles of said one isotope type from which plural energy levels the particles are available for ionization;

the plural energy levels being closely spaced in energy;

the applied energy having plural distinct frequencies corresponding to absorption lines for the particles of the one isotope type.

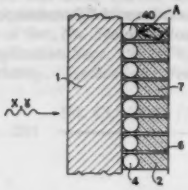
4,023,039

LUMINESCENT SCREEN AND IMAGE-CONVERTER TUBES UTILIZING SUCH A SCREEN

Jean Pierre Galves, and Jean Sagnard, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Jan. 23, 1975, Ser. No. 543,277
Claims priority, application France, Jan. 29, 1974, 02913
Int. Cl.² H01J *31/50*
U.S. Cl. 250—486 **6 Claims**

1. A luminescent screen comprising a layer of luminescent material applied to a substrate characterized in that between said layer and said substrate there is arranged a layer of a granular material which consists of a single layer of glass balls (4) separate from each other by interstices (5) whereby islands of luminescent material separated by microscopic channels (6) are formed in the luminescent layer.

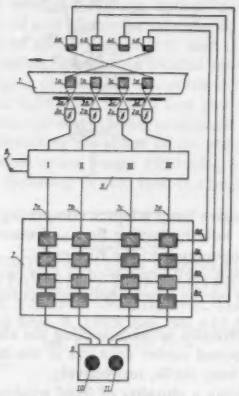


4,023,040

SENSING DEVICE USING PHOTOCELLS, FOR COLOR IDENTIFICATION

Rudolf Weber, Darmstadt-Eberstadt, Germany, assignor to Firma Weber Lichtsteuergerate KG, Darmstadt, Germany

Filed May 7, 1975, Ser. No. 575,444
Claims priority, application Austria, May 7, 1974, 3758/74
Int. Cl.² G06K *7/10*
U.S. Cl. 250—566 **3 Claims**



1. A sensing system, for use in the identification of colored indicia positioned on a body, comprising in combination:

flash lamp means including a plurality of flash lamps each being energizable to produce a burst of light and being adapted to illuminate an associated one of said indicia,

the number of said flash lamps corresponding to the maximum number of said indicia;

photo-electric means associated with each one of said indicia of said maximum number;

each of said photo-electric means being disposed to receive and sense light reflected from its associated indicium and operable to produce a first signal for light sensed having a predetermined color;

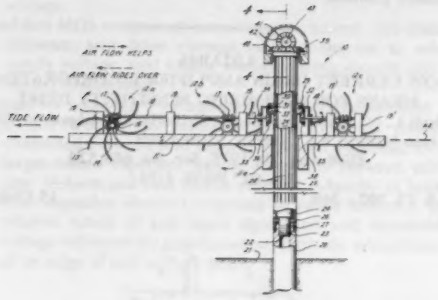
voltage supply means coupled to said flash lamps and comprising a pulse generator operable to produce pulse signals to energize said flash lamps sequentially; and

detector means coupled to each of said photo-electric means and operable to produce a second signal when said first signals are in a predetermined sequence of signals.

4,023,041
APPARATUS FOR GENERATING ELECTRICITY AND POWER FROM NATURAL WATER FLOW

Walter L. Chappell, 700 Gears Road, No. 169, Houston, Tex. 77067

Filed Mar. 1, 1976, Ser. No. 662,546
Int. Cl.² F03B 13/12
U.S. Cl. 290—53 5 Claims



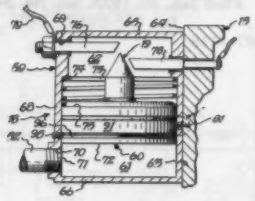
1. An apparatus for generating electricity and power from wave, current and tide action of a body of water, comprising:
a pivot means having a generally vertical axis of rotation which is mounted with a platform in the body of water;
a floating barge laterally spaced from the platform having means mounting the barge with the pivot means for free rotation of the barge means about the axis of the pivot means in response to changes in the direction of water flow and for vertical movement of the barge relative to the axis of the pivot means in response to changes in the water level;
paddle means with the barge means for engagement by the water for converting the force of the water to rotating motion;
generator means on the platform having drive means operatively connected with the paddle means for converting the rotary motion to electricity and power;
the pivot means having a vertical post fixed relative to the platform and the pivot means having a splined sleeve having means mounting the splined sleeve for rotation on the post;
the barge means having means mounting the barge means for free rotation and vertical movement about the splined sleeve; and
the paddle means having drive means operatively connected with the splined sleeve to drive the splined sleeve upon rotation of the paddle means.

4,023,042
ANTI-THEFT DEVICE

Herbert B. Archer, Jr., Box 128, Steamburg, N.Y. 14783, and Ronald J. Kucinski, 4 Washington St., Silver Creek, N.Y. 14136

Filed Mar. 25, 1976, Ser. No. 670,259
Int. Cl.² H02G 3/00
U.S. Cl. 307—10 AT 9 Claims

1. In a motor-driven vehicle having a rotatable selector switch and having an electrical starter circuit including said selector switch and including a starter, and wherein said starter circuit is arranged to normally energize said starter when said selector switch has been rotated to a predetermined position at which said selector switch may close said starter circuit, the improvement which comprises:
an anti-theft device arranged to normally interrupt said starter circuit to prevent said starter from being energized, and operable to complete said starter circuit only when said selector switch has been rotated to said predetermined position, said device including
pressure means operatively arranged to convert rotational movement of said selector switch toward said predetermined position into a flow of hydraulic fluid;
pressure responsive means arranged to interrupt said starter circuit and operatively arranged to receive such flow of hydraulic fluid, said pressure responsive means having two spaced terminals operatively arranged in said starter circuit and having a movable member biased to move

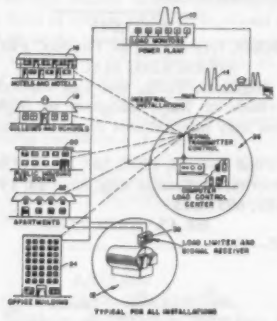


away from said terminals but operable to move toward said terminals in response to said flow of hydraulic fluid; and
contact means mounted on said movable member and arranged to complete said starter circuit between said terminals only when said selector switch has been rotated to said predetermined position;
whereby said starter may not be energized unless said selector switch has been rotated to said predetermined position.

4,023,043
COMPUTERIZED PEAK-SHAVING SYSTEM FOR ALLEVIATING ELECTRIC UTILITY PEAK LOADS

Robert H. Stevenson, Barrington, R.I., assignor to Megatherm Corporation, East Providence, R.I.

Division of Ser. No. 497,967, Aug. 16, 1974, Pat. No. 3,906,242. This application May 15, 1975, Ser. No. 577,936
Int. Cl.² H02J 4/00
U.S. Cl. 307—38 10 Claims



1. A method of lowering peak electrical energy demand on a central electrical distribution network to alleviate a power emergency while minimizing the impact of service disruption, comprising the steps of sensing the approach of an excessive demand peak, in response thereto remotely disconnecting simultaneously a plurality of similar interruptible loads powered via said network, and reconnecting predetermined mutually exclusive groups of said loads automatically, one-group-at-a-time, in accordance with stored permissible offtimes data for corresponding ones of said groups based on characteristic projected energy consumption profiles predicted from past statistical records for said groups, said groups being composed

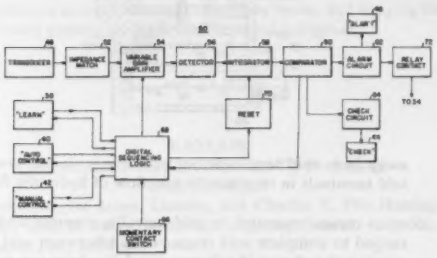
of loads having similar reserve-capacity-versus-time characteristics, whereby said loads are reconnected according to customer needs.

4,023,044

AUTOMATIC MACHINE TOOL INCLUDING A MONITORING SYSTEM

Robert C. Miller, and George T. Mallick, Jr., both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 20, 1975, Ser. No. 542,315
Int. Cl.² G08B *21/00*
U.S. Cl. 307—116 **17 Claims**



1. A machine tool system for performing a repetitive operation upon a workpiece, said system comprising a machine tool and a monitoring system, said monitoring system comprising:

a transducer mounted in association with said machine tool for producing a signal in response to mechanical impulses developed by operation of said machine tool;

means for generating a test function which is a function of said transducer signal;

means for automatically generating a reference function representative of said test function evaluated during normal operation of said machine tool; and

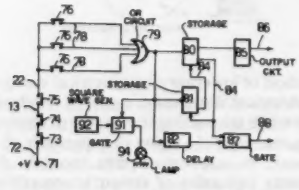
means for comparing said test function with said reference function and for generating a control signal for controlling operation of said machine tool when said test function and said reference function differ by more than a predetermined amount.

4,023,045

OMNIDIRECTIONAL ELECTRONIC PROBE FOR MEASURING MACHINES

Gianfranco Migliardi, Turin, and Ugo Cavicchioli, Borgaro Torinese, both of Italy, assignors to Digital Electronic Automation Italy International Paper Company, New York, N.Y.

Filed Nov. 18, 1975, Ser. No. 632,949
Claims priority, application Italy, Nov. 18, 1974, 70360/74; Oct. 15, 1975, 69574/75
Int. Cl.² H01H *35/00*
U.S. Cl. 307—119 **14 Claims**



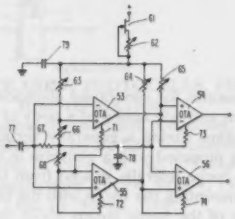
1. Omnidirectional electronic probe for a contour measuring machine of the type having a displaceable head to which the probe is connected, said probe comprising a rod arranged to come into contact with a surface to be inspected, a movable body connected to said rod, and a fixed body supporting said movable body, said movable body being urged by an elastic force towards said fixed body, said fixed and movable bodies including electric contact elements which provide in combination a switch assembly comprising a plurality of contact switches, said movable body with respect to said fixed body having a unique stable balance position which is statically determined by means of a triple, a double and a simple restraint between said two bodies, all of the contact switches of said switch assembly being closed only for said unique stable balance position.

4,023,046

LOW CURRENT DRAIN AMPLIFIER INCORPORATING MEANS FOR MINIMIZING SENSITIVITY DRIFT

Alexis C. M. Renirie, Nijmegen, Netherlands, assignor to Vitatron Medical B.V., Dieren, Netherlands

Filed Aug. 28, 1975, Ser. No. 608,529
Int. Cl.² H03K *5/20*
U.S. Cl. 307—360 **15 Claims**



15. An amplifier circuit, comprising:

a. an amplifier path having at least one active device, and having an input for receiving an input signal and an output for providing an amplified signal, said at least one active device having a current control input terminal;

b. a comparator stage, having an active device with a current control input terminal, said active device having an input terminal being direct coupled to said amplifier path output;

c. current source means for providing a predetermined current to said amplifier path active device current control input terminal; and

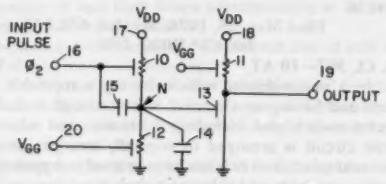
d. connecting means for connecting said comparator stage active device current control input terminal with said amplifier path.

4,023,047

MOS PULSE-EDGE DETECTOR CIRCUIT

Harold Springer Crafts, Saratoga, Calif., assignor to Data General Corporation, Westboro, Mass.

Filed Feb. 19, 1976, Ser. No. 659,306
Int. Cl.² H03K *5/153, 19/40, 17/04, 17/56*
U.S. Cl. 307—363 **5 Claims**



1. An MOS pulse-edge detector circuit comprising:

a supply voltage;

first MOS circuit means, including first and second MOS components serially connected between said supply voltage and ground potential, for dividing down said supply voltage at the node of said components;

second MOS circuit means, connected between said supply voltage and ground potential and adapted to receive said node voltage as an input signal, for establishing a threshold voltage and for providing a first output when said input signal is above said threshold voltage and a second output when said input signal is below said threshold voltage;

said first MOS component including gate, source, and drain elements, said drain element being connected to said supply voltage, said source element being directly connected to said node;

means for receiving a voltage pulse on said gate element;

said first MOS circuit means including capacitor means connected between said node and ground potential, and larger-valued capacitor means connected between said gate element and said source element, whereby at least both capacitor means co-operate to cause inversion in relative values of said input signal and said threshold voltage substantially simultaneously with the occurrence of an edge of said voltage pulse.

4,023,048

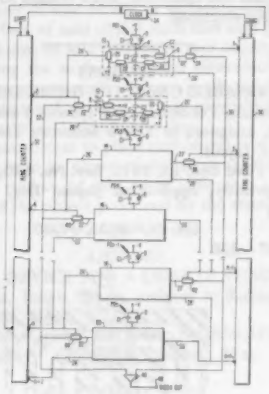
SELF-SCANNING PHOTO-SENSITIVE CIRCUITS

James Darrell Tompkins, Essex, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1975, Ser. No. 641,193

Int. Cl.² H03K *17/10, 17/60, 3/42, 23/12*

U.S. Cl. 307—246 **7 Claims**



1. A charge amplification circuit comprising

first and second field effect transistors, each having a control electrode, a pair of current carrying electrodes and a predetermined threshold voltage loss, said second field effect transistor being connected as a diode in series with said first field effect transistor, the control electrode of said second transistor being connected to one of the current carrying electrodes of said first transistor, the other current carrying electrode of said first transistor being connected to a voltage source,

a capacitor coupled between the control electrode of said first field effect transistor and the current carrying electrode of said second field effect transistor remote from said first field effect transistor,

means for precharging said capacitor to the threshold voltage loss of said first and second transistors,

means for applying a predetermined voltage to the common point between said capacitor and said second field effect transistor, and

means for applying a signal to the control electrode of said first field effect transistor.

4,023,049

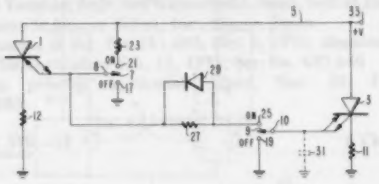
GTO SWITCHING CIRCUITS

Ronald Robert Brooks, Hamilton Square, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,294

Int. Cl.² H03K *17/60, 17/72*

U.S. Cl. 307—252 C **17 Claims**



1. A circuit for sequentially energizing first and second loads, comprising:

first and second terminals for receiving an operating voltage therebetween;

first and second gate-turn-off silicon controlled rectifiers each having an anode electrode connected to said first terminal, a cathode electrode, and a gate electrode, said first and second loads being individually connected between said second terminal and the cathode electrodes of said first and second rectifiers, respectively;

means for selectively completing one of a first direct current conductive path between the gate electrode of said first rectifier and said first terminal, and a second direct current conductive path between the gate electrode of said second rectifier and said second terminal, said first path including current limiting means, for enabling conduction in said first rectifier when said first path is completed, the conduction of said first rectifier causing its gate voltage to be at about the same level as the voltage at said first terminal, and for discontinuing conduction of said first rectifier when the second of said paths is completed, causing the level of voltage at the gate of said first rectifier to be at about the voltage at said second terminal; and

means connected to respond to the voltage at said gate electrode of said first rectifier having a value about equal to the voltage at said first terminal for supplying sufficient turn-on current to the gate electrode of said second rectifier for enabling conduction of said second rectifier, and responsive to the voltage at said gate electrode of said first rectifier having a value about equal to the voltage at said second terminal for discontinuing conduction of said second rectifier.

4,023,050

LOGIC LEVEL CONVERTER

Jeffrey R. Fox, Waltham, and William D. Walsh, Franklin, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

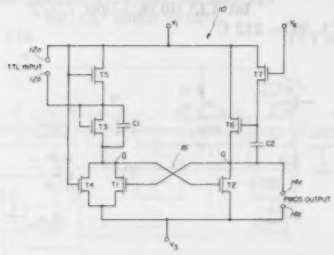
Filed May 10, 1976, Ser. No. 684,603

Int. Cl.² H03K *17/60, 17/04, 3/286, 3/353*

U.S. Cl. 307—264 **13 Claims**

1. A circuit for use in converting a digital input signal having a first logic type and a voltage excursion which is equal to or less than the voltage excursion between first and second voltages to a related digital output signal having a second logic type and a voltage excursion which is equal to or less than the voltage excursion between the first voltage and a third voltage and which is greater than the voltage excursion of the input digital signal, including:

a. means for providing the first and the third voltages;
b. first and second inverters, each of which has an input and an output which is the opposite logic level as the input, the input of each inverter being coupled to the output of the opposite inverter,
c. the second inverter being biased with respect to the first and third voltages and providing the digital output signal at the output thereof,
d. the first inverter being biased with respect to the third voltage and the digital input signal voltage, the first inverter further having voltage divider means coupled thereto to produce at the output of the first inverter a voltage intermediate the first and third voltages and a voltage intermediate the second and third voltages, the intermediate voltages being effective to switch the output of the second inverter between the first and third voltages, and



e. the first and second inverters having dissimilar gains for insuring that the digital output signal is at a level corresponding to the third voltage when the digital signal is at a level corresponding to the first voltage.

4,023,051

RECTIFIER SWITCH WITH SERIES-CONNECTED THYRISTORS

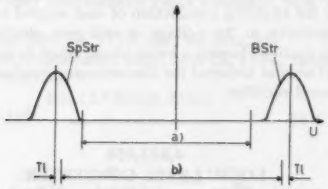
Peter Etter, Oberehrendingen, and Werner Faust, Wettingen, both of Switzerland, assignors to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Oct. 6, 1975, Ser. No. 619,980

Claims priority, application Switzerland, Oct. 28, 1974, 14397/74

Int. Cl.² H03K *3/35*

U.S. Cl. 307—305 **2 Claims**



1. A method of improving the use efficiency of a batch of high voltage thyristors by enabling use of said thyristors near their individual maximum voltage ratings, comprising the steps of:

preparing a batch of high voltage thyristors having forward and reverse blocking voltages which exhibit a spread of at least 10%,

matching said forward and reverse blocking voltages of each said thyristor with a controlled avalanche device having substantially the same forward and reverse blocking voltages,

connecting said voltage matching controlled avalanche devices in parallel with said thyristors for forming voltage matched thyristors; and,

coupling said voltage matched thyristors in series for utilization at voltage levels near their individual maximum rated breakdown and blocking voltages.

4,023,052

TOUCH CONTROL ARRANGEMENT

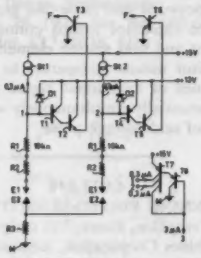
Klaus Kroner, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,187

Claims priority, application Germany, Sept. 8, 1973, 2345438; Sept. 8, 1973, 2345495

Int. Cl.² H03K *27/00;* **H03J** *1/00*

U.S. Cl. 307—308 **4 Claims**



1. A touch control circuit arrangement comprising a touch contact having two electrodes, an amplifier having an input coupled to one of said electrodes, a constant current source coupled to said one electrode, and a voltage source coupled to the remaining electrode.

4,023,053

VARIABLE CAPACITY DIODE DEVICE

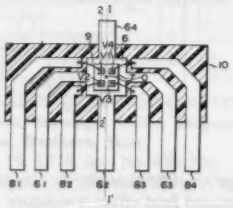
Shoichi Shimizu, Yokohama, and Hisashi Yamada, Oiso, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 15, 1975, Ser. No. 640,891

Claims priority, application Japan, Dec. 16, 1974, 49-152470[U]

Int. Cl.² H03K *17/00*

U.S. Cl. 307—320 **9 Claims**



1. A variable capacity diode device comprising:

a semiconductor chip having at least three variable capacity diodes formed on a semiconductor substrate;

an electroconductive member for ground on which the semiconductor chip is mounted so as to be sealed within a package;

a plurality of external ground conductors, each connected to the electroconductive member and each extending out of the package;

a plurality of external connection conductors, each connected to a variable capacity diode, each extending out of the package, and each being supplied with a signal different from each other having a frequency of 30 to 300 megahertz;

each external ground conductor being situated between two adjacent external connection conductors for preventing signal interference between the two adjacent external connection conductors.

4,023,054

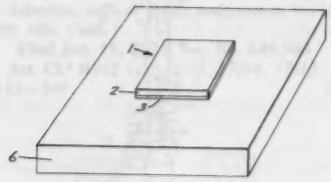
STRAIN SENSOR EMPLOYING PIEZOELECTRIC MATERIAL

Allen L. Taylor, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 467,016, May 6, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 616,906

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.3 **6 Claims**



1. A process for producing a detectable image of the surface strain gradient of an object, including the steps of:
   1. providing a strain sensor that includes at least one poled, piezoelectric layer of material that produces electrostatic charges of opposite polarities on its planar surfaces when subjected to a stress, said layer having a conductive layer carried on not more than one of its planar surfaces;
   2. attaching said strain sensor on said object with the conductive layer of said sensor in surfaceto-surface contact with a surface of said object such that said piezoelectric layer conforms to said surface of said object;
   3. neutralizing the surfaces of said piezoelectric layer to remove any electrostatic charges produced thereon as a result of the conformance of said piezoelectric layer to the surface of said object; and then
   4. stressing said object to place said object in a condition of strain to create an electrostatic latent charge pattern on the other surface of said layer indicative of the strain gradient of the object produced by the stress.

4,023,055

MOUNTING DEVICE FOR A QUARTZ TUNING FORK

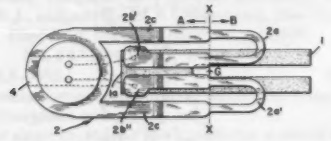
Nobuo Tsukada, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Mar. 17, 1975, Ser. No. 559,237

Claims priority, application Japan, Mar. 15, 1974, 49-29741

Int. Cl.² H01L *41/04*

U.S. Cl. 310—9.1 **7 Claims**



1. A quartz vibrator device comprising, in combination: a quartz element of the tuning fork type; a supporting spring member connected to and supporting said quartz element; and means including a pedestal and a protective casing jointly mounting said supporting spring member thereby mounting said quartz element; said supporting spring member having at one end portion at least two divided U-shaped portions with one end portion of said U-shaped portions supporting one end portion of said quartz element, the other end portion of said supporting spring member being fixed to said pedestal, said U-shaped portions being elongated and extending along said quartz element beyond center of gravity point of said quartz element.

4,023,056

COLLISION DETECTING SYSTEM

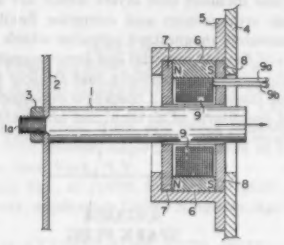
Takashi Yamada, Anjo, and Kazuo Oishi, Oobu, both of Japan, assignors to Nippon Soken, Inc., Nisnio, Japan

Continuation of Ser. No. 511,693, Oct. 3, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,640

Claims priority, application Japan, Nov. 30, 1973, 48-135105

Int. Cl.² H02K *35/00*

U.S. Cl. 310—15 **6 Claims**



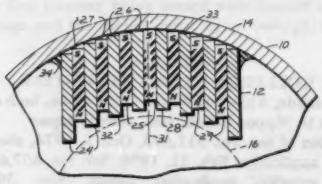
1. A collison detecting system of a vehicle so as to detect a collision and trigger an occupant protective system comprising:
   a permanent magnet having a cylindrical form and magnetized in an axial direction;
   a pair of disk pole pieces of magnetic material each having a central opening and pressed against the end portion of said permanent magnet;
   a cylindrical case member of non-magnetic material enclosing said permanent magnet and said pair of disk pole pieces which are disposed in substantially coaxial relation therewith said case being mounted to the body of the vehicle;
   a single generating coil having a cylindrical form and fixedly mounted in an internal space defined by said permanent magnet and said pair of disk pole pieces, said generating coil having coil ends which are electrically connected with an occupant protective system;
   a plunger composed of a magnetic material and having a uniform shape in section;
   wherein said plunger is slidably mounted through the central opening of said disk pole pieces so as to be movable between an initial position and a position following collision in response to a deceleration due to a collision, said plunger having first and second portions, said first portion being located to constitute a magnetic circuit together with said permanent magnet and said disk pole pieces and said second portion being located outside said magnetic circuit when said plunger is in said initial position and wherein said second portion is movable into the magnetic circuit and said first portion is movable out of said magnetic circuit when said plunger is moved to said position following collision whereby the dimensions and material in said magnetic circuit is maintained substantially constant so that the change in flux resulting from a change in the portion of said plunger positioned within said magnetic circuit in response to a collision produces an induced voltage in said generating coil.

4,023,057

ELECTRIC MOTOR FIELD MAGNETS

John H. Meckling, Apopka, Fla., assignor to Pacific Textile & Chemical Corporation, Altamonte Springs, Fla.

Filed Mar. 22, 1974, Ser. No. 453,685
Int. Cl.² H02K 23/04
U.S. Cl. 310—154 15 Claims



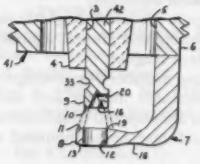
1. An electric motor having a compound field magnet with a permanent magnetic field, said magnet being a laminated structure that includes thin layers which are assembled in a face-to-face arrangement and comprise flexible layers that have permanently magnetized particles which are embedded in a matrix of flexible material and ferromagnetic metal layers respectively interposed between said flexible layers, each of said flexible layers having a thickness dimension which is less than about one-fourth of an inch, and said metal layers having a higher permeability than said flexible layers.

4,023,058

SPARK PLUG

Jose Hector Lara, and Edward B. Williams, Jr., both of P.O. Box 876, Greenville, Tex. 75401

Filed May 14, 1976, Ser. No. 686,559
Int. Cl.² H01T 13/20
U.S. Cl. 313—139 8 Claims



1. In a spark plug having a metal shell with an insulator positioned therein and a first electrode extending from one end of said insulator and a second electrode extending from said metal shell, said first and second electrodes having free end portions in adjacent spaced relation, a spark controlling structure comprising:

a. means on free end portions of first and second electrodes defining respective facing ridges each in the form of a closed geometric figure thereby defining a spark discharging portion on said first electrode and a spark landing portion on said second electrode whereby said spark discharging portion and said spark landing portion cooperate to form a spark in the form of a hollow column having one end thereof in the shape of the geometric figure defining the spark discharging portion and the other end in the shape of the geometric figure defining the spark landing;

b. means on said free end portion of said second electrode defining a port extending through said second electrode free end portion, said port being within and surrounded by said ridge on said second electrode free end portion; and

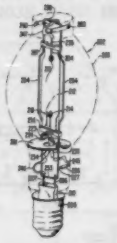
c. means on said free end portion of said second electrode defining a reduced width and thickness portion adjacent said ridge on said second electrode free end portion.

4,023,059

HIGH PRESSURE LIGHT EMITTING ELECTRIC DISCHARGE DEVICE

Scott Anderson, 1116 W. Church St., Champaign, Ill. 61820

Division of Ser. No. 259,858, June 5, 1972, Pat. No. 3,948,793.
This application Apr. 23, 1975, Ser. No. 570,778
Int. Cl.² H01J 61/18
U.S. Cl. 313—184 16 Claims



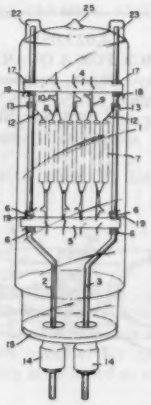
1. A high presure, light emitting, electric discharge device, which device comprises an arc tube having at least one electrode therein, a vaporizable fill disposed within said tube including a halide of a metal other than mercury introduced into the arc tube as solidified droplets of metal halide and having a total oxegen content of less than 50 parts per million.

4,023,060

RUGGEDIZED, HIGH POWER TUNGSTEN-HALOGEN LAMP

Bernard Pike, Ipswich; Thomas A. Brewin, Hamilton, and Charles Kokinos, Jr., Lynn, all of Mass., assignors to GTE Sylvania Incorporated, Salem, Mass.

Filed Nov. 28, 1975, Ser. No. 636,326
Int. Cl.² H01J 1/88
U.S. Cl. 313—273 7 Claims



1. A tungsten-halogen lamp comprising:

an hermetically sealed, light-transmitting envelope of generally tubular shape having a base at one end and a generally dome-shaped portion at the other end;

a gas mixture within said envelope comprising an inert gas and a halogen;

a pair of tungsten lead-in rods extending through said base

into the interior of said envelope, said rods having substantially parallel portions within said envelope;

a pair of bridge members within said envelope, each supported between said rods and disposed in a substantially parallel, spaced-apart relationship;

a tungsten filament having a plurality of coiled sections suspended between and supported by said bridge members; and

a pair of externally protruding cavities provided in the dome portion of said envelope within which the ends of said rods are respectively retained but not sealed.

4,023,061

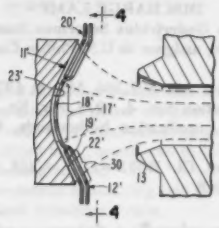
DUAL MODE GRIDDED GUN

Albert Edward Berwick, San Jose, and George Valentine Miram, Atherton, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Jan. 19, 1976, Ser. No. 649,944

Int. Cl.² H01J *1/46, 1/52, 17/04, 17/12*

U.S. Cl. 313—349 **11 Claims**



1. A grid-controlled electron gun for a linear beam tube comprising:

a cathode emitter having corresponding points of its surface lying on a concave surface of revolution about an axis,

a first electron-permeable grid overlaying a central portion of said surface of revolution,

a second electron-permeable grid overlaying only an annular portion of said surface of revolution outside said central portion,

support means for supporting said grids and said cathode in individually spaced and insulated relation,

means for applying separate electric potentials to each of said grids and said cathode,

the improvement being

the intersection of said surface of revolution with a plane containing said axis having a smaller radius of curvature at a point on said central portion than at a point on said annular portion

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4,023,062

LOW BEAM DIVERGENCE LIGHT EMITTING DIODE

Henry Kressel, Elizabeth, and Michael Ettenberg, Freehold, both of N.J., assignors to RCA Corporation, New York, N.Y.

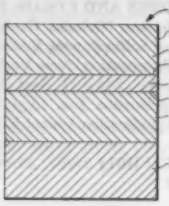
Filed Sept. 25, 1975, Ser. No. 616,598

Int. Cl.² H01J *1/62;* **H01L** *29/161*

U.S. Cl. 313—498 **8 Claims**

1. A semiconductor light emitting diode with reduced light emission divergence comprising:

a body of single crystalline semiconductor material having a first region of one conductivity type, a second region of a conductivity type opposite to that of said first region and a third region between and contiguous to said first and second regions, the junctions between the third region and each of the first and second regions being heterojunctions, with the index of refraction of each of the first and second regions being at least 3% less than the index of refraction of said third region at the peak emission wavelength of said third region, each of said first and second regions having an energy band gap greater than that of said third region with the difference in the energy band gap being greater than 0.1 eV and said third region having



a thickness, between each of said heterojunctions, of less than 0.125 microns.

4,023,063

COLOR TUBE HAVING CHANNEL ELECTRON MULTIPLIER AND SCREEN PATTERN OF CONCENTRIC AREAS LUMINESCENT IN DIFFERENT COLORS

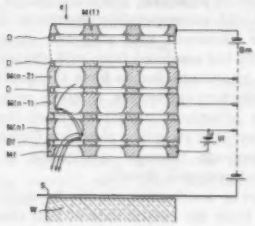
Hewson Nicholas Graham King, and Derek Washington, both of Salfords, near Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 17, 1974, Ser. No. 461,539

Claims priority, application United Kingdom, Apr. 19, 1973, 18965/73

Int. Cl.² H01J *31/48, 31/20, 39/18*

U.S. Cl. 313—400 **3 Claims**



1. Electron beam apparatus, comprising:

a channel plate electron multiplier having an array of channels connecting an input face to an output face, the individual electron beams from the channels of which are substantially in the form of hollow beams;

a target spaced from and parallel to the output face of said channel plate, said target having a concentric pattern of areas corresponding to and aligned with each of said channels, each pattern comprising at least two concentric areas which luminesce in different colors in response to electron bombardment and are spaced by a concentric guard ring area which does not luminesce in response to electron bombardment;

a focusing control electrode between said channel plate and said target having an aperture for a hollow electron beam aligned with each of said channels, said focussing control electrode having an outward flare at least on the side towards said target; and

means for applying suitable electric potentials to said focusing control electrode to control the diameter of the hollow beams so that electron bombardment of said target may be directed primarily onto either one of said at least two concentric areas having different responses to electron bombardment.

4,023,064

CHANNEL PLATE WITH COLOR SELECTION ELECTRODES AND COLOR PHOSPHORS

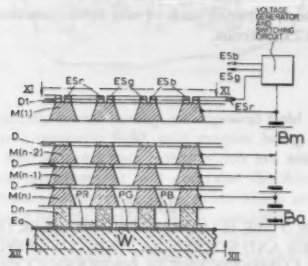
Pieter Schagen; Hewson Nicholas Graham King, and Derek Washington, all of Salfords near Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 288,597, Sept. 13, 1972, Pat. No. 3,860,849. This application Jan. 13, 1975, Ser. No. 540,582

Claims priority, application United Kingdom, Aug. 8, 1972, 42723/72

Int. Cl.² H01J *29/07, 29/08, 29/28*

U.S. Cl. 313—400 **4 Claims**



1. An image display screen for use in a color television tube, comprising:

a channel plate defining a display area and having an input side for receiving electrons into channels of said channel plate from a scanning electron beam and output side for delivering electrons from channels of said channel plate, said channel plate having parallel rows of channels;

an electrically conducting strip-like element associated with each row of channels, the channels of each row being aligned with corresponding apertures in said associated striplike elements, said strip-like elements being supported by but insulated from said channel plate and electrically interconnected to form at least two interdigitated color selection electrodes, whereby emission of electrons may be selectively prevented from the channels associated with the strip-like elements forming a color selection electrode through application of an appropriate electrical potential thereto;

a transparent accelerator electrode coextensive with and spaced from the output side of said channel plate by an insulating layer having apertures aligned with the channels of said channel plate; and

separate color phosphors corresponding to each of said at least two color selection electrodes, each separate color phosphor being formed as discrete phosphor areas within the apertures of said insulating layer which correspond to the channels associated with the strip-like elements forming the corresponding color selection electrode, whereby electrons may be selectively prevented from reaching a color phosphor by application of an appropriate electrical potential to the color selection electrode corresponding thereto.

4,023,065

METHOD AND APPARATUS FOR GENERATING AND UTILIZING A COMPOUND PLASMA CONFIGURATION

Paul M. Koloc, Box 222, College Park, Md. 20740

Filed Oct. 24, 1973, Ser. No. 409,060

Int. Cl.² H05H *1/02, 1/24*

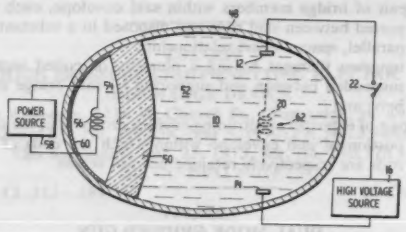
U.S. Cl. 315—111.2 **47 Claims**

1. An apparatus for producing and utilizing a compound plasma configuration comprising:

means for containing said compound plasma configuration,

power supply means for producing heliform circulating currents in said containing means; and,

a deformable medium in said containing means for forming



a mantle of ionized particles substantially confining external fields of said circulating currents.

4,023,066

OPERATING CIRCUIT FOR A GAS AND/OR VAPOUR DISCHARGE LAMP

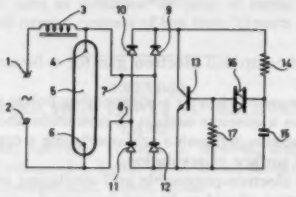
Herman Adrianus Goderfridus Severinus Smulders, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 467,386, May 6, 1974, abandoned. This application Nov. 4, 1975, Ser. No. 628,593

Claims priority, application Netherlands, May 21, 1973, 73/07039

Int. Cl.² H05B *41/23, 41/38*

U.S. Cl. 315—209 R **8 Claims**



1. A circuit arrangement for supplying alternating current to an operating electric discharge lamp comprising, a pair of input terminals for connecting said lamp to an alternating voltage source, means connecting a series arrangement of at least a stabilizing inductor and the lamp across said input terminals, means connecting a circuit comprising a controlled semiconductor switch in shunt with the lamp, a control circuit for triggering the semiconductor switch into conduction at least once every second half cycle of the alternating voltage source in the normal operating condition of the lamp, the control circuit being coupled to a control electrode of the controlled semiconductor switch for applying a switch-off control voltage to the control electrode of said switch, and wherein the control circuit of said semiconductor switch includes a branch having an element with a relatively short time constant such that the switch is triggered on and off at least several times during each of said second half cycles of the alternating voltage source.

4,023,067

INVERTER BALLAST CIRCUIT

William B. Zelina, Edinboro, and James E. Hetherington, Girard, both of Pa., assignors to Lighting Systems, Inc.

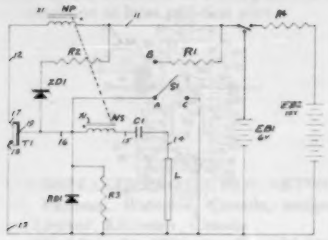
Continuation of Ser. No. 398,959, Sept. 20, 1973, abandoned. This application Aug. 4, 1975, Ser. No. 601,255

Int. Cl.² H05B *41/29*

U.S. Cl. 315—209 R **16 Claims**

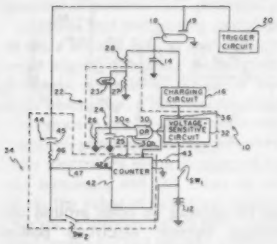
10. An inverter circuit for a fluorescent light comprising, lamp means,

capacitor means,
a first inductive means,
second inductive means,
switching means having a control element,
said lamp means, said capacitor means and said first inductive means being connected in series,
an electronic valve having a first power element and a second power element,
said lamp, said capacitor means and said second inductive means comprising a control circuit,



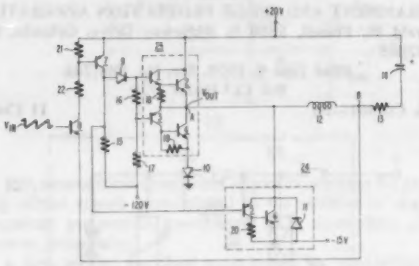
and said second inductive means and said first power element and said second power element being connected in series with each other and comprising a power circuit,
said control circuit being connected to said control element of said switching means,
magnetic core means connecting said first inductive means to said second inductive means,
and means for connecting a power source to said power circuit whereby current flows in said second inductive means and induces current in said first inductive means.

4,023,068
ELECTRONIC FLASH APPARATUS FOR CONSERVING FLASH BATTERY LIFE
Donald Malcolm Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Mar. 15, 1976, Ser. No. 666,721
Int. Cl.² H05B *41/32*
U.S. Cl. 315—241 P **8 Claims**



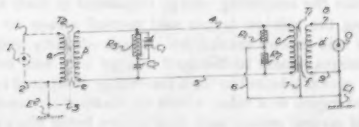
1. In an improved electronic flash unit of the type including a flashtube having (1) a normal non-conductive state and (2) a conductive state, a flashtube firing capacitor for storing an electrical potential to render said flashtube conductive, means for charging said firing capacitor, and monitor means responsive to the charge on said firing capacitor (1) for operably coupling a source of electrical potential to said firing capacitor when the charge on said firing capacitor is below a predetermined level and (2) for effectively de-coupling such electrical potential source from said charging means when the charge on said firing capacitor is above said predetermined level, the improvement comprising:
means for automatically disabling said monitor means after a time interval during which said flashtube is maintained in its non-conductive state.

4,023,069
VERTICAL DEFLECTION CIRCUIT
John Charles Peer, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.
Filed Apr. 28, 1976, Ser. No. 681,036
Int. Cl.² H01J *29/70, 29/76*
U.S. Cl. 315—397 **9 Claims**



1. A deflection circuit comprising:
a deflection winding;
a deflection amplifier with an output terminal coupled to said winding for providing current to said winding;
a first voltage source coupled to said amplifier for providing an operating voltage to said amplifier;
a source of input signals coupled to an input terminal of said amplifier for defining trace and retrace intervals during each deflection cycle, said signals turning off said amplifier at the end of the trace interval thereby causing a voltage to be developed across said winding opposing a change in current in said winding;
a second voltage source; and
switching means coupled to said input terminal and said output terminal of said amplifier and said second voltage source and being responsive to the voltages at said input and output terminals for coupling a greater magnitude voltage across said winding during said retrace interval and bypassing current away from said amplifier during said retrace interval.

4,023,070
ELECTRICAL CIRCUIT FOR AUDIO SERVICES
Charles Francis McCrory, 6 E. Wickham St., Roker, Sunderland SR6 0EH, England
Filed Apr. 7, 1975, Ser. No. 565,640
Int. Cl.² H02H *9/04*
U.S. Cl. 361—43 **4 Claims**



1. An audio device, comprising an electro-acoustic transducer, connected to a primary winding of a first transformer, said primary winding being also connected to ground at a first point and a secondary winding of said transformer being connected to the primary winding of a second transformer by signal conductors, a secondary winding of said second transformer being connected to an amplifier circuit of a mains powered amplifying and loud speaker apparatus, said secon-

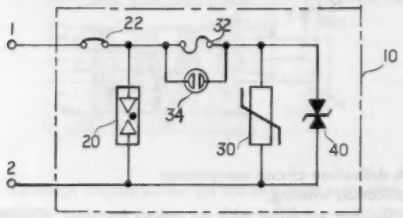
dary winding being connected to ground at a second point separate and electrically isolated from said first point.

4,023,071

TRANSIENT AND SURGE PROTECTION APPARATUS

Gerald W. Fussell, 5810 S. Ridgeway Drive, Orlando, Fla. 32805

Filed June 9, 1975, Ser. No. 584,742
Int. Cl.² H02H *3/20*
U.S. Cl. 361—56 11 Claims



1. Apparatus for protecting electrical power systems and equipment connected thereto from damage due to voltage transients and surges that exceed the maximum instantaneous peak voltages of the systems, comprising:

first electrical energy-dissipation means having a first breakdown voltage slightly greater than the maximum instantaneous peak voltage, said first means responsive essentially instantaneously to a voltage surge exceeding such first breakdown voltage, to dissipate a first portion of energy contained in such surge;

second electrical energy-dissipation means having a selected second breakdown voltage slightly less than said first breakdown voltage of said first means, said second means responsive after a selected first delay period to such voltage surge to dissipate a second portion of energy contained in such surge, causing the voltage across said first means to drop below said first breakdown voltage whereby said first means ceases to dissipate energy with said first delay period selected to limit the energy-dissipation in said first means to a value within the dissipation capability of said first means, said second means being electrically connected to said first means;

third electrical energy-dissipation means having a selected third breakdown voltage essentially equal to said first breakdown voltage, said third means responsive after a selected second delay period to such voltage surge to dissipate the remaining energy contained in such surge, causing the voltage across said second means to drop below said second breakdown voltage whereby said second means ceases to dissipate energy with said second delay period selected to limit the energy dissipated in said second means to a value within the dissipation capability of said second means, said third means being electrically connected to said second means; and

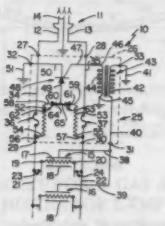
wherein said first, second, and third electrical energy-dissipating means are electrically connected to an electrical power system whereby said first, second, and third means cooperate to dissipate the energy of said voltage surge without damage to said first and second means thereby preventing such voltage surge from exceeding a value slightly greater than the maximum instantaneous peak voltage of such power system.

4,023,072

ELECTRICAL PROTECTION MEANS AND METHOD

Emil Robert Plasko, Washington Township, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 321,752, Jan. 8, 1973, Pat. No. 3,936,702.
This application Nov. 13, 1975, Ser. No. 631,500
The portion of the term of this patent subsequent to Feb. 3, 1993, has been disclaimed.
Int. Cl.² H02H *3/00*
U.S. Cl. 361—50 5 Claims



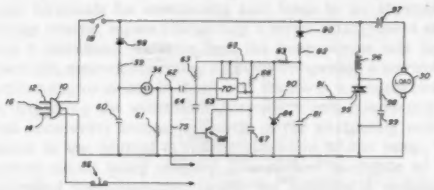
1. In combination, a ground lead, a pair of main leads for interconnecting an electrical power source to at least one electrically operated unit, each main lead having a thermally activated device therein for opening the respective main lead when said device is activated, said main leads being respectively interconnected to a pair of branch leads respectively having a pair of electrically operated heating means therein for respectively activating said devices when said branch leads are operatively interconnected to ground, and control means for substantially simultaneously interconnecting said branch leads to said ground lead.

4,023,073

OPEN CIRCUIT DETECTOR

Donald Kenneth Georgi, Plymouth, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Dec. 8, 1975, Ser. No. 638,295
Int. Cl.² H02H *3/16*
U.S. Cl. 361—45 7 Claims



1. An apparatus for sensing an open ground circuit in a three-wire alternating current electrical power circuit wherein a first and second wire carry alternating current respectively and a third wire is a circuit ground wire, comprising:

a. means for sensing the presence of an alternating current voltage, including a gas discharge lamp having a first impedance when unignited and a second impedance when ignited, and further including a capacitor and diode circuit connected to a lamp terminal and serially to said first and second wires and a resistance connected to a second lamp terminal and to said capacitor-wire connection, whereby rectified alternating voltage periodically voltage-charges said capacitor and causes said lamp to ignite to discharge said capacitor voltage charge into said resistance, and an output terminal connected to said resistance to convey a signal thereon representative of the

presence or absence of the sensed alternating current voltage;

b. means for generating a control signal, including a semiconductor switching element connected to said sensing means output terminal and said second wire, said switching element having an output terminal switchable into low impedance coupling with said second wire in response to a signal on said sensing means output terminal; and

c. power transfer means, including relay contacts connected in series to at least said first wire and a relay energization coil connected between said first wire and said switching element output terminal, for passing and blocking electrical voltages on at least said first wire.

4,023,074

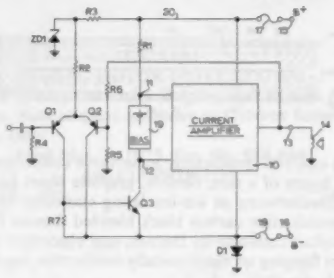
LOUDSPEAKER PROTECTION NETWORK

Roland H. Fichtner, Waterloo, Canada, assignor to Electrohome Limited, Kitchener, Canada

Filed Nov. 21, 1975, Ser. No. 634,243

Int. Cl.² H02H *7/20*

U.S. Cl. 361—88 **4 Claims**



1. A current amplifier having first and second input terminals and an output terminal, means for direct coupling said output terminal to a loudspeaker, a source of positive D.C. potential, a source of negative D.C. potential, means connecting said source of positive D.C. potential via a first fuse to said current amplifier and connecting said source of negative D.C. potential via a second fuse to said current amplifier to power said current amplifier, biasing means connected between said input terminals, a predriver transistor having base, collector and emitter electrodes, a first resistor, said first resistor being connected between one of said input terminals and one of said sources of D.C. potential via one of said fuses, said collector and emitter electrodes being connected between the other of said input terminals and the other of said sources of D.C. potential via the other of said fuses, second and third transistors connected in differential amplifier configuration and each having base, collector and emitter electrodes, means connecting said emitter electrodes of said second and third transistors to one of said sources of D.C. potential via one of said fuses to bias on said second and third transistors, means connecting said collector electrode of said second transistor and said base electrode of said predriver transistor whereby said predriver transistor is biased on from said sources of D.C. potential when said fuses are intact, means for applying an input signal to said base electrode of said second transistor, a negative D.C. feedback network connected between said output terminal and said base electrode of said third transistor and a diode connected directly to ground in series circuit with said emitter electrode of said predriver transistor, said diode being poled and connected to permit said predriver transistor to be biased on when said other fuse blows.

4,023,075

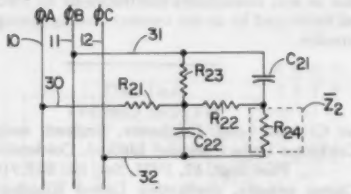
INDUCTORLESS SYMMETRICAL COMPONENT SEQUENCE ANALYZER

William L. Reuter, Rapid City, S. Dak., assignor to Dunham Associates, Inc., Rapid City, S. Dak.

Continuation of Ser. No. 451,115, March 14, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,564

Int. Cl.² H02H *3/28*

U.S. Cl. 361—76 **8 Claims**



1. A symmetrical component sequence analyzer for providing output signals proportional to the positive or negative sequence symmetrical component of a three-phase power source, comprising:

a. first, second and third input means for connection to a three-phase power source;

b. an output terminal;

c. first and second resistance elements connected in series between said first input means and said output terminal;

d. a first capacitance element connected between said second input means and said output terminal;

e. a third resistance element connected between said second input means and the connection of said first and second resistance element; and

f. a second capacitance element connected between said third input means and the connection of said first and second resistance element;

g. whereby said output signals proportional to the symmetrical component of the three-phase power source are developed between said output terminal and said third input means.

4,023,076

DISCHARGE GAP DEVICE

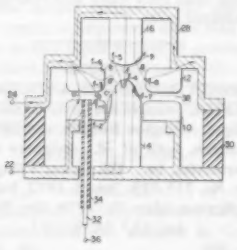
Yotsuo Ishida, Chofu, and Hiroshi Kuwahara, Amagasaki, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and Tokyo Electric Power Co., Ltd., both of, Japan

Filed Oct. 20, 1975, Ser. No. 624,235

Claims priority, application Japan, Nov. 20, 1974, 49-133891

Int. Cl.² H02H *3/20*

U.S. Cl. 361—118 **5 Claims**



1. An electric discharge gap device comprising, in combination: a pair of conductive electrode support plates disposed in an opposed relationship; a pair of main electrodes in the form

of toroids supported in a spaced opposed relationship on respective ones of said electrode support plates to define an arc gap therebetween; a pair of rod-shaped consumable electrodes supported on respective ones of said electrode support plates and disposed coaxially with said main electrodes and oppositely to each other, said main electrodes and said consumable electrodes being composed of an electrically conductive material higher in resistivity than the electrically conductive material forming said electrode support plates; and means for transferring an electric arc struck across said main electrodes to said consumable electrodes by an electromagnetic force developed by an arc current flowing through said main electrodes.

4,023,077

GATING CIRCUIT

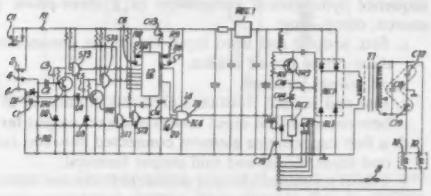
Peter Graham Long, Colchester, England, assignor to The Colchester Lathe Company Limited, Colchester, England

Filed Sept. 12, 1975, Ser. No. 612,910

Claims priority, application United Kingdom, Sept. 17, 1974, 40435/74

Int. Cl.² H01H *47/32*

U.S. Cl. 361—187 **4 Claims**



1. A control circuit for a relay or the like, said circuit comprising:

a. sensor circuit means for monitoring a parameter and for producing sensor output signals related to that parameter, said sensor output signals being in a chosen condition only when the value of said parameter is within a preselected range,

b. first circuit means including a resistor connected between the power supply for said sensor means and ground (earth), and at least one Schmitt-trigger coupled thereto for sensing said supply voltage and providing a first signal which is in a chosen condition only when said supply voltage exceeds a predetermined level,

c. second means responsive to electrical interference in said sensor circuit and in said first circuit means to take said sensor output signals outside the chosen condition,

d. NAND gate means for receiving said sensor output signals and said first signal to provide a NAND gate output of a preselected level only when all said signals are present in their chosen condition, and

e. signal conditioning means for said NAND gate output to energize the relay only when said NAND gate output has said preselected level.

4,023,078

PRINTED CIRCUIT BOARD FOR A SOLID-STATE SOUND EFFECT GENERATING SYSTEM

William E. Olliges, Arlington Heights, and Edward L. Polanek, Glendale Heights, both of Ill., assignors to Universal Research Laboratories, Inc., Elk Grove Village, Ill.

Division of Ser. No. 215,025, Jan. 3, 1972, Pat. No. 3,831,172. This application Mar. 28, 1974, Ser. No. 455,620

Int. Cl.² H02B *1/02*

U.S. Cl. 361--399 **1 Claim**

1. An interchangeable plug-in printed circuit board for use with an electronic sound-generating system for an audio-visual amusement device of the type in which specific events are each accompanied by a corresponding predetermined sound effect, and in which said system includes a control chassis having a plurality of jacks for interchangeably changing and receiving a plurality of said circuit boards, said chassis further having means for interconnecting said received circuit boards, said circuit board comprising a non-conductive substrate having mounted thereon an electronic circuit capable of being actuated to develop an electrical output signal representative of a unique one of said sound effects, said substrate having a plug portion including a plurality of contacts adapted to mate with said jacks; and means mounted on the substrate for providing manual adjustment of the volume of said unique one of said sound effects, whereby a unique one of said sounds provided by signals from one circuit board may have a volume that is adjustably different from another unique one of said sounds provided by signals from another circuit board.

4,023,079

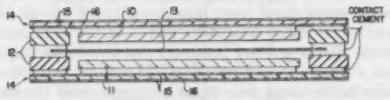
GRAPHITE-ELASTOMER SANDWICH AS IMPERVIOUS CONNECTOR FOR AN ELECTRICAL CAPACITOR

Theodore B. Selover, Jr., Shaker Heights, and Donald L. Boos, Garfield Heights, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 261,287, June 9, 1972, abandoned. This application Nov. 15, 1973, Ser. No. 416,034

Int. Cl.² H01G *9/02*, *9/10*

U.S. Cl. 361—433 **17 Claims**



1. An electron-conducting, impervious connector comprising two layers of a thin, flexible, graphite sheet having interposed therebetween an ion-insulating elastomer having electrically-conductive carbon black blended therein for imparting electrical conductivity thereto, said elastomer and graphite layers forming an electronically conductive, ion-insulating, sandwich structure.

4,023,080

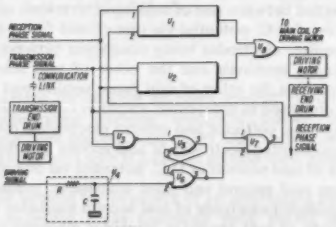
PHASE SYNCHRONIZING CIRCUIT

Kenji Tanimoto, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,731

Int. Cl.² G05B *1/06*

U.S. Cl. 318—85 **2 Claims**



1. A circuit which synchronizes a motor at the receiving end of a communication link with one at the transmitting end thereof, said motors respectively driving drums at the receiving and transmitting ends of said link, said receiving end including means responsive to the receiving end drum for generating a reception phase signal each rotation of the receiving end drum and said transmitting end including means responsive to the transmitting end drum for generating a transmission

phase signal each rotation of the transmitting end drum, said circuit comprising

a phase synchronizing circuit for repeatedly applying to the main coils of the receiving end motor reduced frequency signals having a lower frequency than the rated frequency thereof to thereby reduce the phase deviation between the receiving and transmitting end motors, said phase synchronizing circuit generating each reduced frequency signal upon each occurence of said reception phase signal and terminating each reduced frequency signal upon each occurrence of said transmission phase signal, said reduced frequency signals being applied to said main coils until said reception and transmission phase signals are brought into phase; and

means for maintaining the application of said reduced frequency signals to said main coils of the receiving end motor during the starting time of the receiving end motor even though the reception and transmission phase signals may temporarily be in phase during the starting time.

4,023,081

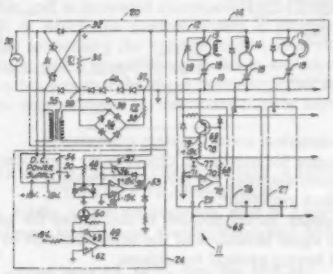
PLURAL MOTOR DRIVE SYSTEM

James E. Murray, University Heights, and Robert J. Resch, Chardon, both of Ohio, assignors to Cyberex Incorporated, Mentor, Ohio

Filed Mar. 3, 1975, Ser. No. 554,664

Int. Cl.² H02P *1/58*

U.S. Cl. 318—109 **16 Claims**



1. A common bus energization system comprising, in combination,

a first bus conductor,

a second bus conductor,

means for connecting a plurality of individual loads in parallel between said bus conductors,

said loads including reactances capable of operating on direct current and a controllable semi-conductor connected to control the current therethrough,

voltage source means including first means connected to supply a first unidirectional voltage between said first and second bus conductors which for a majority of the time is positive on said first conductor,

and said voltage source means including second means to establish a second voltage between said first and second bus conductors to establish with said first voltage a resultant voltage positive on said first conductor for a majority of time and negative on said first conductor for a minority of time for a net average polarity of a positive voltage on said first conductor.

4,023,082

SPEED CONTROL CIRCUIT FOR A DC MOTOR HAVING A HALL GENERATOR

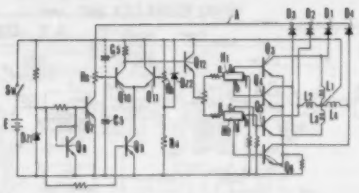
Kinji Tanikoshi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan, part interest to each

Filed Dec. 20, 1974, Ser. No. 534,895

Claims priority, application Japan, Dec. 26, 1973, 49-3254; Apr. 26, 1974, 49-47301; Apr. 26, 1974, 49-47302; Apr. 26, 1974, 49-47303

Int. Cl.² H02P *5/06*

U.S. Cl. 318—138 **15 Claims**



1. A DC motor and control system therefor comprising:

a. a first and second terminal for having a source of electrical power supplied thereto,

b. a rotor having magnetic poles of opposite polarities thereon,

c. a stator having field windings positioned in torque-producing relation to said rotor, wherein a first end of each of said windings is coupled to the first power source terminal, generating an induction voltage which corresponds to the rotation speed of said rotor at a second end of each of said windings,

d. a detecting means, which is connected to the second end of each of said windings detecting and synthesizing the induction voltage of each of the windings,

e. an input means for reference rotation speed information, which is coupled to said terminal of said power source for providing as an output a prescribed level of voltage corresponding to a standard rotation speed of the motor,

f. a voltage level shifting means, which is coupled to said detecting means to produce an output voltage shifted to a constant voltage level from the output voltage of the detecting means,

g. a comparator means, which consists of a differential type amplification circuit having two input terminals, wherein one of the input terminals is connected to said voltage level shifting means while the other input terminal is connected to the input means for the reference rotation speed information so as to provide a signal representing the difference between said two inputs,

h. Hall generators positioned in flux-sensing relationship to said magnetic poles, an input terminal of the Hall generator being connected to an output terminal of said comparator means, and wherein an input voltage which corresponds to the output voltage of the above mentioned comparator means is impressed and a Hall voltage which corresponds to said input voltage is generated, and

i. a driving control means connected to the output of Hall generators and said stator windings, for applying exciting current to said windings in response to the output voltage of said Hall generators.

4,023,083

TORQUE REGULATING INDUCTION MOTOR SYSTEM

Allan Barr Plunkett, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Apr. 14, 1975, Ser. No. 568,120

Int. Cl.² H02P *5/40*

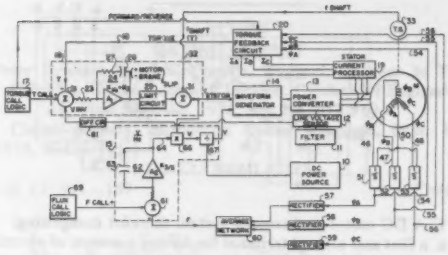
U.S. Cl. 318—227 **34 Claims**

1. An improved torque regulating control system for an

alternating current induction motor having a stator and a rotor spaced from one another by an air gap, said stator including a winding adapted to be excited by a controllable source of electric power so as to produce electromagnetic flux across said air gap, wherein the improvement comprises:

a. motor flux feedback means including means mounted on the motor stator adjacent to said air gap for sensing the actual flux produced across said air gap when said stator winding is excited and means coupled to said flux sensing means for deriving output actual flux signals representative in magnitude and phase of the actual air gap flux;

b. actual torque feedback circuit means responsive to said



actual flux signals and to sensed motor stator line currents for deriving an actual value of torque feedback control signal;

c. first feedback control loop means responsive to said actual value of torque feedback control signal for controlling the operation of the power source so as to vary the frequency of stator excitation in a manner that maintains operation of the induction motor at a controlled value of torque; and

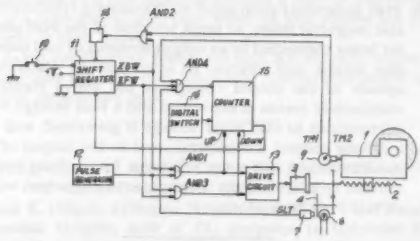
d. second feedback control loop means responsive to said actual flux signals for controlling the power source so as to control the amplitude of stator excitation in a manner that produces a substantially controlled air gap flux level.

4,023,084

CONTROL APPARATUS FOR A MACHINE TOOL

Kaoru Owa, Kariya, Japan, assignor to Toyoda Koki Kabushiki Kaisha, Japan

Filed Oct. 9, 1975, Ser. No. 621,077
Claims priority, application Japan, Oct. 9, 1974, 49-116709
Int. Cl.² G05B *19/24*
U.S. Cl. 318—603 **5 Claims**



1. Control apparatus for a machine tool having a tool support supporting a tool for machining a workpiece and movable relative to said workpiece through a feed screw comprising:

pulse generating means for generating a train of pulse signals;

a drive motor for rotating said feed screw to move said tool support relative to said workpiece in response to said pulse signals;

means for generating a reference pulse for every unit rotational movement of said feed screw;

means for causing said drive motor to be actuated to move said tool support away from said workpiece;

detecting means for generating an output signal when said tool support is moved in the vicinity of an original position;

means for specifying one of said reference pulses in response to said output signal from said detecting means to define said original position;

means for digitally setting a distance between said original position and a start position; and

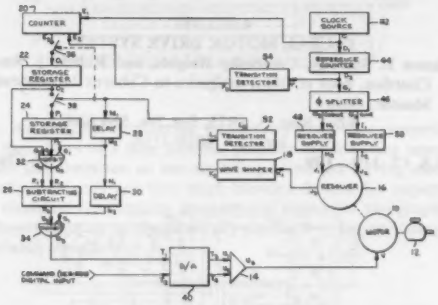
means for causing said drive motor to be actuated to move said tool support toward said workpiece by the distance set by said digitally setting means from said original position defined by the specified reference pulse.

4,023,085

NUMERICAL CONTROL SYSTEM HAVING A DIGITIZED PHASE LOOP

Everett Reece Bishop, and Marcel Henri Leroux, both of Waynesboro, Va., assignors to General Electric Company, New York, N.Y.

Filed Aug. 6, 1975, Ser. No. 602,489
Int. Cl.² G05B *1/03, 19/28*
U.S. Cl. 318—608 **2 Claims**



1. A numerical control system comprising:

a. a motor for moving an object being controlled;

b. a servo amplifier for driving said motor;

c. a clock oscillator;

d. feedback means coupled to said motor for generating a first signal indicative of the actual position of the object and having cyclical transitions;

e. means for converting the first signal to a digital signal indicative of a change in the actual position of the object comprising:

1. a counter driven by said clock oscillator;

2. a first storage means for consecutively receiving a plurality of signals from said counter in response to the respective consecutive transitions of the first signal, each of the received signals having a count indicative of the actual position of the object;

3. a second storage means for consecutively receiving a plurality of signals from said first storage means in response to the respective consecutive cyclical transitions of the first signal, whereby the signal received in said first storage means in response to one cyclical transition of the first signal is then received in said second storage means in response to a next succeeding cyclical transition of the first signal; and

4. means for consecutively subtracting the signal stored in said first storage means from the signal stored in said second storage means in response to the respective consecutive cyclical transitions of the first signal to generate the digital signal indicative of the change in

the actual position of the object within a time period determined by two successive cyclical transitions of the first signal; and

f. means for comparing a command digital signal indicative of the desired change in position of the object with the digital signal indicative of the change in the actual position of the object to generate an error digital signal and for converting the error digital signal to an analog signal for driving said servo amplifier.

4,023,086

CONTROL SYSTEM FOR RECTIFIER EQUIPMENT

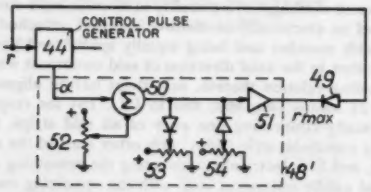
Lars-Erik Juhlin, Ludvika, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed June 5, 1975, Ser. No. 584,004

Claims priority, application Sweden, July 10, 1974, 74090648

Int. Cl.² H02M *1/08*

U.S. Cl. 321—11 **3 Claims**



1. Control system for a rectifier unit (41) for high voltage direct current transmission (43) comprising a control pulse emitter (44) for the valves of the rectifier unit and a regulator 45 for setting the control angle of the control pulse emitter, said regulator on the output side being provided with a signal limiter (48') for limiting the control signal when the voltage of the rectifier unit is increased corresponding to a smaller control angle, in which the control system is provided with a means (50) for sensing the control angle (α) of the control pulse emitter, which means is connected to said signal limiter (48') in such a way that the upper limit (Δr_{max}) of the magnitude of the control signal (r) decreases control angle (Δ).

4,023,087

OVERVOLTAGE PROTECTION FOR A DIRECT CURRENT TRANSMISSION

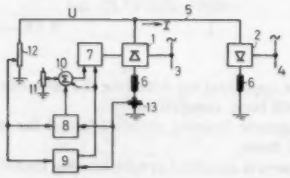
Lars Erik Juhlin, and Kjell Svensson, both of Ludvika, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Sweden

Filed June 19, 1975, Ser. No. 588,347

Claims priority, application Sweden, July 19, 1974, 7409436

Int. Cl.² H02M *7/00*

U.S. Cl. 321—19 **5 Claims**



1. Rectifier station (1) for a high voltage direct current transmission (5) comprising a rectifier bridge with a control system (7), and means to limit the direct voltage of the station in the event of disturbances on the transmission, said means comprising devices (12,8) in the control system for sensing the direct voltage of the station and developing the derivative of this voltage, said devices including means to deliver signals to limit the voltage increase of the station when said voltage and derivative exceed given values.

4,023,088

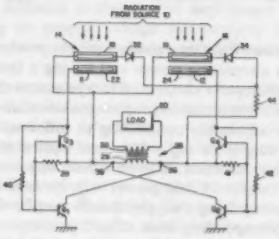
RADIATION-TO-A.C. CONVERTER

Herbert H. Fowler, P.O. Box 11431, Lexington, Ky. 40511, assignor to White, Letcher T., Manchester, Ky.

Filed July 23, 1975, Ser. No. 598,230

Int. Cl.² H02N *00/00*

U.S. Cl. 322—2 R **7 Claims**



1. A radiation-to-electrical energy converter adapted for use with a radiation source and comprising a pair of radiant energy absorbers, and means for producing an alternating current by alternately irradiating said absorbers to predetermined levels with radiation furnished by said source.

4,023,089

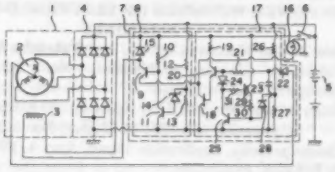
GENERATOR VOLTAGE CONTROL APPARATUS

Kenjiro Arakane, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 30, 1975, Ser. No. 619,940

Int. Cl.² H02J *7/14*

U.S. Cl. 322—28 **5 Claims**



1. A generator voltage control apparatus comprising: a generator for generating an output voltage, the generator having a field coil and an output coil;

a battery charged by the output of the generator, one terminal of the battery being connected to the output coil and also adapted for connection to one end of the field coil;

a first transistor having an on state and an off state and connected to the other end of the field coil for controlling current passed through the field coil to maintain constant the voltage of the generator;

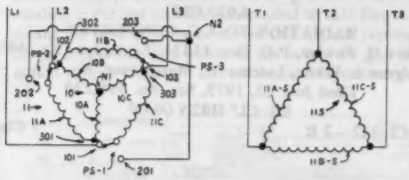
a charge display lamp connected in series between the first transistor and the other terminal of the battery; and

a second transistor having an on state and an off state and connected in parallel to the charge display lamp, the second transistor when in its on state forming a short circuit for the charge display lamp.

4,023,090
ZAGREB ELECTRICAL CIRCUIT

Peter Kljucaricek, 14753 Bade, Warren, Mich. 48093

Filed July 6, 1976, Ser. No. 703,075
Int. Cl.² H01F 29/02
U.S. Cl. 323—47 12 Claims



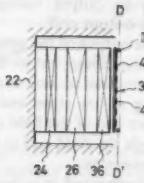
1. In an electrical three phase variable power supply fed by three phase alternating power and having a three coil adjustable autotransformer connected in wye across the power lines, said autotransformer having tap means associated with each of its coils for adjustably connecting to different turns thereof, said power supply having at least one neutral joining the coils of said autotransformer, Zagreb circuit apparatus for varying the power output of said power supply, said Zagreb circuit apparatus comprising a supply transformer having a three coil primary, corresponding ends of said primary coils connected to said tap means, respectively, and means for arranging said primary coils in relation to said autotransformer alternatively as follows:

a. connecting them in delta across said power lines for maximum power output;
b. connecting them in wye in parallel with said autotransformer for an intermediate value of output power;
c. taking them out or substantially out of electrical circuit for zero or minimum output power;
d. connecting the opposite ends of said primary coils to said power lines, respectively, while adjusting the respective positions of said tap means for a high range of variable output power; and
e. commonly connecting said opposite ends to a neutral while adjusting the respective positions of said tap means for a low range of variable output power.

4,023,091
APPARATUS FOR DETECTING AXIAL DISPLACEMENTS IN POWER WINDINGS OF ELECTRIC INDUCTION MACHINES

Toshio Fujita; Katusada Ishida, and Takehiko Funakoshi, c/o Kabushiki Kaisha Meidensha, No. 2-1-17, Ohsaki, Shinagawa, Tokyo, Japan

Division of Ser. No. 457,721, April 3, 1974, abandoned. This application Oct. 25, 1975, Ser. No. 625,159
Claims priority, application Japan, Apr. 4, 1973, 48-38966; Apr. 7, 1973, 48-40129
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 R 7 Claims

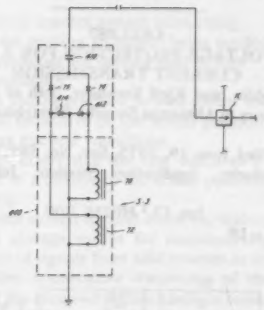


1. An apparatus for detecting the axial displacements between the electromagnetic median planes of a plurality of cylindrical power windings (24, 26, 36 in FIG. 14) disposed coaxially about an iron core of an electric induction machine and with each other, the median plane being defined as extending across the lengthwise axis of said windings and which has equal ampere-turns on either side thereof, the apparatus comprising: a cylindrical auxiliary winding arrangement (38) disposed coaxially around the outer circumference of the outermost power winding (36), and adapted to be placed in electromagnetically coupled relationship to a given one of said power windings, thereby causing said auxiliary winding arrangement to produce a magnetic leakage flux having opposed radial components with opposite signs when said given winding is excited; means disposed around the outer circumference of said auxiliary winding arrangement for detecting the difference between the quantities of the opposed radial components of the leakage flux, said detecting means including at least one saddle-shaped search coil (30 in FIG. 14) for linking and detecting the opposed radial components of the leakage flux, said auxiliary winding arrangement and said detecting means being movable together in the axial direction of said power windings relative to the latter; said auxiliary winding arrangement including (a) a dielectric hollow cylindrical member (42) to cover substantially the whole outer surface of said outermost winding, (b) a plurality of circular, equi-sized strips (44) of an electrically conductive material, attached to said dielectric member and being equally spaced and parallel to each other in the axial direction of said outermost winding in surronding relation thereto, said strips having aligned ends, and (c) means (46, 46*a*, 46*b* in FIG. 15) for respectively electrically connecting one ends of all said strips, but one axially outermost strip (44*b*), with other ends of the adjacent strips, and for electrically connecting the remaining one end of said axially outermost strip with the remaining end of the oppositely axially strip (44*a*) to form a closed coil.

4,023,092
APPARATUS FOR SENSING METAL IN WELLS

Austin S. Rogers, Houston, Tex., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 465,081, April 29, 1974, Pat. No. 3,942,373. This application Dec. 4, 1975, Ser. No. 637,523
Int. Cl.² G01R 33/12
U.S. Cl. 324—34 R 5 Claims



1. A probe apparatus for detecting the presence of a ferrous mass in a well bore, comprising:

a. non-magnetic housing means adapted for movement in the well bore;
b. sensor means mounted in said housing means, said sensor means comprising:
   1. upper inductive coil means adapted to form a magnetic field;
   2. lower inductive coil means adapted to form a magnetic field;
   3. means to supply alternate half-cycles of AC energy to said upper and lower coil means to thereby energize

said coil means on alternate half-cycles to form said magnetic fields;

4. said fields of said upper inductive coil means and said lower inductive coil means responding to the presence of a ferrous mass in the well bore unequally spaced from said upper inductive coil means and said lower inductive coil means by changing the electrical characteristics thereof to form peak-to-peak offset AC pulses which are sent to the surface;

c. monitor means at the surface responsive to said sensor means for indicating the presence of the ferrous mass; and

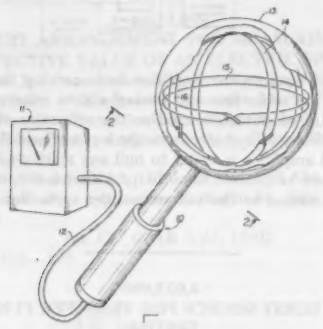
d. means in said sensor means to block any DC signals from affecting said sensor means.

4,023,093

MAGNETIC FIELD RADIATION DETECTOR

Edward E. Aslan, Plainview, N.Y., assignor to The Narda Microwave Corporation, Plainview, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,962
Int. Cl.² G01R *33/02*
U.S. Cl. 324—43 R **8 Claims**



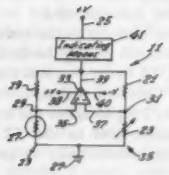
1. A magnetic field radiation detector for measuring the intensity of a magnetic field within a predetermined frequency range, comprising a plurality of loop antennas each connected to a thermocouple positioned substantially within the periphery thereof, means for tuning said loop antennas to a resonant frequency below the lower end of said range, and high resistance leads interconnecting said thermocouples in series.

4,023,094

ELECTRONIC THERMOMETER

Robert P. Adams, 605 Hightree Road, Santa Monica, Calif. 90402

Continuation of Ser. No. 265,651, June 23, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,220
Int. Cl.² G01R *27/00*
U.S. Cl. 324—57 R **15 Claims**



1. In combination for determining an unknown value of impedance, comprising:

first impedance means for providing the unknown value of impedance to be determined;

second impedance means for providing an impedance adjustable through a range of known values of impedance;

third impedance means providing a first particular value of impedance;

fourth impedance means providing a second particular value of impedance;

first connecting means coupling the first, second, third and fourth means in a bridge to form first and second impedance branches each including an individual pair of the first, second, third and fourth impedance means and each including a common terminal between the impedance means in that branch;

fifth means responsive to the voltage on the common terminal in the first impedance branch and the voltage on the common terminal in the second impedance branch for producing an output voltage representing any voltage difference between the voltages on such common terminals;

sixth means responsive to the output voltage from the fifth means for introducing such output voltage to the first and second impedance branches in a positive feedback to energize such impedance branches for the production, on the common terminal in the first impedance branch and the common terminal of the second impedance branch, of voltages having a first value for unbalances of a first particular amplitude in the relative values of the impedances in the first and second impedance branches and voltages having a second particular amplitude distinctively different from the first particular amplitude for unbalances of a second polarity in the relative values of the impedance in the first and second impedance branches;

the second means comprising:

fifth impedance means for providing a particular value of impedance;

sixth impedance means for providing a particular value of impedance;

seventh impedance means for providing a particular value of impedance;

eighth impedance means for providing an impedance adjustable through a range of known values of impedance;

second connecting means coupling the fifth, sixth, seventh and eighth impedance means to form third and fourth impedance branches each including an individual pair of the fifth, sixth, seventh and eighth impedance means and a common terminal between the impedance means in that branch;

ninth means responsive to the voltage on the common terminal in the third impedance branch and the voltage on the common terminal in the fourth impedance branch for producing an output voltage representing any voltage difference between the voltages on such common terminals; and

tenth means responsive to the output voltage from the tenth means for introducing such output voltage to the third and fourth impedance branches to energize such impedance branches for controlling the production of the voltages on the common terminals in the third impedance branch and the common terminal in the fourth impedance branch in accordance with such output voltage.

4,023,095

CIRCUIT FOR MEASURING THE SENSITIVITY OF A CARDIAC PACER

Robert A. Walters, Pittsburgh, Pa., assignor to ARCO Medical Products Company, Leechburg, Pa.

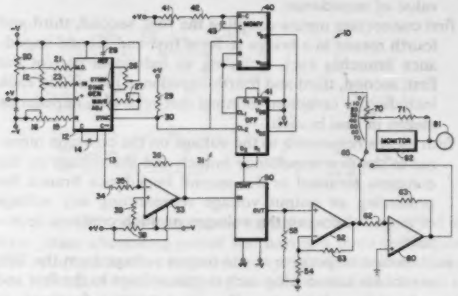
Filed Mar. 15, 1976, Ser. No. 666,739
Int. Cl.² G01R *27/00*
U.S. Cl. 324—57 R **5 Claims**

1. An analyzer for measuring the sensitivity of a cardiac

pacer of the type which responds to a heart generated signal, comprising:

means for applying signals to said pacer of controlled varying amplitude,

means for monitoring the response of said pacer to said applied signals,



means for monitoring the generation of stimulation pulses of said pacer,

and means for displaying the amplitude of the signals which just produced the response of said pacer.

4,023,096

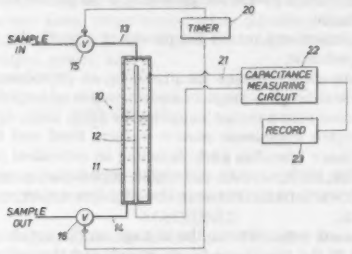
METHOD AND APPARATUS FOR DETERMINING PHYSICAL CHARACTERISTICS OF EMULSIONS

Thomas R. Schmidt, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 17, 1976, Ser. No. 658,933

Int. Cl.² G01R *27/26*

U.S. Cl. 324—61 R **8 Claims**



1. A method for determining the settling time and percent of constituents in an emulsion comprising:

placing a fixed quantity of the emulsion in a closed cell;

retaining the fixed quantity of emulsion in the cell while separating the emulsion into its individual constituents; and

measuring the capacity of the cell as the emulsion constituents separate the time required for the cell capacity to reach a steady state being related to the settling time of the emulsion and the magnitude of the steady state capacity being related to the percent of constituents in the emulsion.

4,023,097

NOISE AND DIELECTRIC ABSORPTION COMPENSATION CIRCUIT

Richard Emil Hanashey, Tustin, Calif., assignor to Datatron, Inc., Santa Ana, Calif.

Filed Nov. 21, 1975, Ser. No. 634,025

Int. Cl.² G01R *15/12;* **H03B** *1/00*

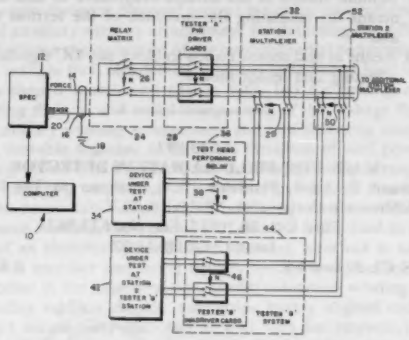
U.S. Cl. 324—73 R **14 Claims**

1. A circuit to compensate for spurious signals such as current noise and dielectric absorption kickback generated through voltage changes within a pair of lines mutually connected to a load that is to be tested as to its response to certain signals impressed thereon comprising:

a first force line connected to said load under test upon which a signal is impressed;

a second sense line upon which a signal is to be sensed in the form of a current emanating from said load;

a first operational amplifier having a connection to the force line; and,



a second operational amplifier for receiving the current from the sense line and having a zero reference point, with an output connected to the reference of the first amplifier and opposite from the input of said first operational amplifier in order to null any spurious signals on the two respective lines to provide an output directly proportional to the current on the sense line from the load.

4,023,098

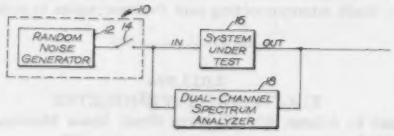
NOISE BURST SOURCE FOR TRANSFER FUNCTION TESTING

Peter R. Roth, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 27, 1975, Ser. No. 602,842

Int. Cl.² G01R *23/16*

U.S. Cl. 324—77 R **7 Claims**



1. A method of measuring transfer functions of a system under test, the method comprising the steps of:

a. generating and applying a transient random stimulus of period T seconds in length to the system under test, this step including the steps of:

generating a random stimulus; and

applying the random stimulus to the system under test for a period of T2 seconds during the initial portion of the T second period, T2 being a period that is substantially shorter than the T second period, and T being a period that is sufficiently long to allow the transient response of the system under test to the T2 second random stimulus to decay substantially to zero during the T second period;

b. recording the transient random stimulus generated in step (a) during its application to the system under test;

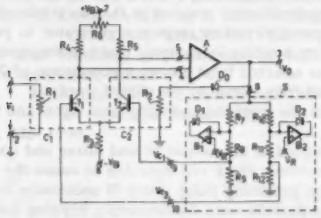
c. measuring the spectrum of the transient random stimulus during its T second period;

d. applying the recorded transient random stimulus to the system under test after the T second period of the transient random stimulus generated in step (a) has been completed;
e. measuring the spectrum of the response of the system under test during the T second period of the transient random stimulus applied thereto in step (d);
f. computing a first estimate of the transfer function of the system under test from the two measured spectra;
g. repeating steps (a) through (f) to obtain an additional estimate of the transfer function of the system under test using a transient random stimulus that is uncorrelated with previous stimuli;
h. averaging together each additional estimate and the average of the previously obtained estimates of the transfer function of the system under test; and
i. repeating steps (g) and (h) a sufficient number of times to obtain an average estimate of the transfer function of the system under test within a selected accuracy.

4,023,099
CIRCUIT ARRANGEMENT FOR MEASURING THE EFFECTIVE VALUE OF AN ELECTRIC SIGNAL

Theodorus Jozef van Kessel; Eric Henricus Jozef Maria Stulemeijer, both of Eindhoven; Johannes Maria Pieper, and Hendrikus Fransiscus Bonifatius Bloemen, both of Lelyweg, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 585,834
Claims priority, application Netherlands, June 17, 1974, 7408033
Int. Cl.² G01R *5/22, 19/02*
U.S. Cl. 324—105 **18 Claims**

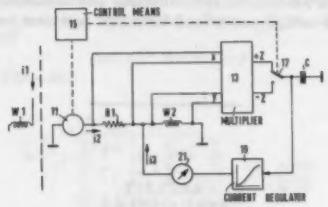


1. A measuring arrangement for measuring the effective value of an electric a.c. signal comprising, a first energy dissipating element to which the a.c. signal is applied; a first temperature-sensitive element thermally coupled to said first energy dissipating element for converting the thermal energy produced by the first energy dissipating element into a first electric signal; a second energy dissipating element; a second temperature sensitive element thermally coupled to said second energy-dissipating element for converting the thermal energy produced by the second energy-dissipating element into a second electric signal; a differential amplifier with two inputs to which the first and the second electric signals are applied, and an output at which a d.c. output signal becomes available, means for applying the d.c. output signal to the second energy-dissipating element, a negative-feedback circuit responsive to the d.c. output signal for producing a negative feedback signal for values of the d.c. output signal smaller than a specific threshold value, said negative-feedback signal in the region around the zero value being linearly dependent on said d.c. output signal, and means for adding the negative feedback signal to at least one of the two electric signals supplied by the temperature-sensitive elements.

4,023,100
TRANSFORMER FOR D-C SIGNALS

Kurt Smutny, Baumschuleweg 7, Erlangen, Germany

Filed Aug. 28, 1975, Ser. No. 608,786
Claims priority, application Germany, Sept. 4, 1974, 2442223
Int. Cl.² G01R *33/00, 19/00*
U.S. Cl. 324—117 R **6 Claims**

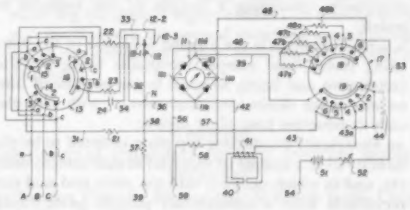


1. In a transformer for d-c signals having a primary winding through which a d-c current flows, a core of magnetically soft material and a secondary winding which is acted upon by an electrical variable having a polarity which changes if the core reaches saturation, with a current measuring device coupled to the secondary, the improvement comprising:
a. means coupled to the secondary winding to cause it to be acted upon by a current which continuously changes between two maximum values of opposite polarity;
b. a measuring resistor in series with the secondary winding;
c. a multiplier having one input coupled across said measuring resistor and another input coupled across said secondary winding, said multiplier providing two complementary outputs;
d. a double-throw switch alternately coupling the current measuring device to one and the other complementary outputs of said multiplier; and
e. means to switch said double-throw switch from one output to the other output each time a positive or negative maximum value of current is reached.

4,023,101
MULTIPLE FUNCTION ELECTRICAL MEASURING AND INDICATING APPARATUS

Virgil F. Christoffer, 2601 Stoneridge Court, Arlington, Tex. 76014

Filed Aug. 20, 1975, Ser. No. 606,290
Int. Cl.² G01R *19/00, 25/00*
U.S. Cl. 324—107 **10 Claims**



1. In apparatus for measuring electrical values of a circuit to be tested
a meter for indicating the flow of alternating current, and associated apparatus circuitry comprising
three phase-resistors; three phase-conductors for connecting the three phases of an external circuit to the measuring apparatus circuit;
a selector switch for connecting said three phase-conductors to said phase-resistors, and for selecting each of three connective relationships between said three phase-conductors and said three phase-resistors;

means connecting said three phase-resistors to a common juncture; said meter being connected in series with a first one of said phase-resistors;

switch means for selectively connecting and disconnecting a third one of said phase-resistors to and from said common juncture;

a phase-component connected with said third phase-resistor to a common terminal of said selector switch; and switch means for selectively connecting and disconnecting said phase-component to and from said common juncture.

4,023,102

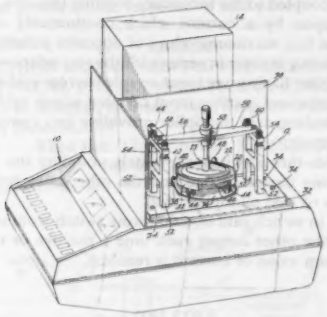
TEST FIXTURE

William J. Barrow; Stephen M. Fromnick, both of Wilmington, Del., and Robert Mayer, Ardmore, Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed May 1, 1975, Ser. No. 573,698

Int. Cl.² G01R 27/00, 31/00

U.S. Cl. 324—158 F **10 Claims**



1. A test fixture for allowing an accurate measurement of selected electrical parameters of a sample of material being tested in the fixture and comprising:

a. a base means for providing an electrically and mechanically stable base for the test fixture;

b. an electrically conductive base plate means, supported by said base means, for receiving on its top surface a sample receptacle containing a sample of the material being tested;

c. a sample receptacle for holding a sample of the material being tested, said sample receptacle being electrically conductive and being adapted to be positioned directly on and make direct electrical contact with said electrically conductive base plate means;

d. an electrically conductive top plate adapted to be placed directly over a sample of material in said sample receptacle, and in which position said top plate and said sample receptacle form a substantially parallel plate capacitor with the sample material being disposed as a dielectric material between said top plate and said sample receptacle;

e. bridge means, supported by said base means and electrically insulated from said conductive base plate means, for allowing a stable electrical contact to be made with said top plate, whereby the test fixture provides a mechanically and electrically stable environment in which a sample of material being tested may be placed as the dielectric material in a substantially parallel plate capacitor and selected electrical parameters of the sample material may be measured.

4,023,103

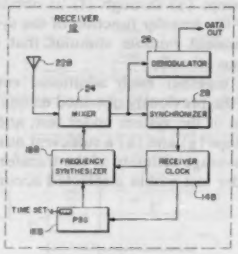
SYNCHRONIZER FOR FREQUENCY HOPPING RECEIVER

Robert E. Malm, Los Angeles, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 26, 1976, Ser. No. 652,586

Int. Cl.² H04B 7/20

U.S. Cl. 325—58 **10 Claims**



1. A circuit for synchronizing a frequency hopping receiver with a companion frequency hopping transmitter comprisng:

a pseudo-random sequence generator responsive to an activating pulse for stepping one digital word of a predetermined indexable sequence of *n*-bit digital words, each digital word being from a population of 2^n distinct digital words, the pseudo-random sequence generator including time registering means indexable together with the sequence of digital words, and operator settable means for indexing the time registering means and the sequence of digital words,

an electronic clock that provides timing pulses for activating the pseudo-random sequence generator at the frequency hopping rate to step the sequence of digital words and the time registering means,

a frequeny synthesizer coupled to the electronic clock and to the pseudo-random sequence generator to provide a frequency hopping local signal that is a sequence of frequencies selected from among a population of 2^n predetermined frequencies by the digital words,

a mixer for the frequency hopping local signal and received signals, and

means coupled to the output of said mixer and coupled to said electronic clock and operable to cause the clock to skip one activating pulse every N successive frequency hopping periods, until the frequency hopping local signal and a frequency hopping signal from the companion receiver are out of sync of less than one frequency hopping period.

4,023,104

SYSTEM FOR ESTABLISHING SIGNAL LEVEL FOR TRANSMISSION OF A CATV CABLE

William A. Rheinfelder, Phoenix, Ariz., assignor to Alpha Engineering Corporation, Phoenix, Ariz.

Filed Aug. 8, 1975, Ser. No. 602,967

Int. Cl.² H04B 3/56

U.S. Cl. 325—308 **7 Claims**

1. In a system for receiving , combining and amplifying television signals for transmission on CATV system cables, said system including adjustable gain preamplifying means for each television channel, the improvement comprising:

a. a combining network for receiving, at inputs thereof, and combining a plurality of television signals each having a frequency corresponding to a different television channel, and for providing a combined signal at an output thereof;

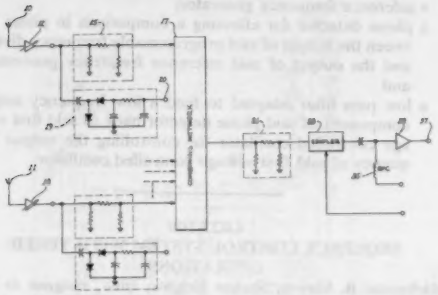
b. a plurality of input circuits connected to receive television signals of different channels, each connected to a

different input of said combining network, each input circuit having circuit means connected thereto comprising:

i. means for deriving a DC voltage level proportional to a TV signal applied thereto;

ii. a calibration resistor in series with said means for deriving a DC voltage level;

c. meter means selectively connectable to each of said calibration resistors for measuring the level of a television signal at one of said input circuits;



d. amplifying means for receiving said combined signal and providing an amplified combined signal for transmission on a CATV cable;

e. means connecting the output of said combining network to said amplifying means; and

f. each of said calibration resistors having a value to provide a predetermined meter deflection when a television signal of a different one of said channels is at a desired level.

4,023,105

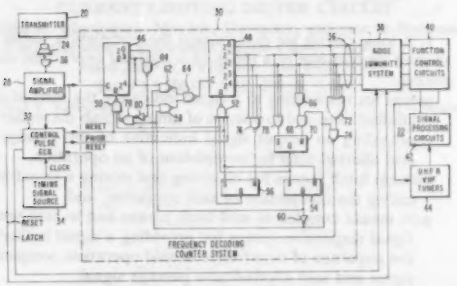
COUNTER TYPE REMOTE CONTROL RECEIVER PRODUCING BINARY OUTPUTS CORRELATED WITH NUMERICAL COMMANDS OF A COMPANION REMOTE CONTROL TRANSMITTER

Kenneth Rau Woolling, Jr., Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,699

Int. Cl.² H04B 1/06

U.S. Cl. 325—390 **10 Claims**



1. In a remote control receiver for receiving control signals representative of a plurality of numerical quantities, each numerical quantity being identified by control signals lying in a respective band of frequencies, the combination comprising:

means for supplying timing reference signals recurring at predetermined time intervals; and

counter means responsive to said timing reference signals and to said control signals for providing binary output signals representing an accumulated count, said counter means including means for offsetting the count represented by said binary output signals in a predetermined manner so that digits thereof correspond to a binary coded representation of each received numerical quantity.

4,023,106

INPUT CIRCUIT OF VHF TELEVISION SET TUNER

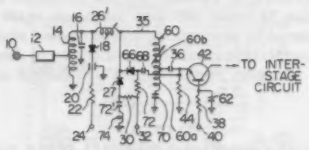
Keisuke Utsunomiya, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sept. 15, 1975, Ser. No. 613,504

Claims priority, application Japan, Sept. 17, 1974, 49-108057

Int. Cl.² H04B 1/18

U.S. Cl. 325—462 **2 Claims**



1. In an input circuit for use in a television set tuner tunable to the frequencies of a desired channel by varying a d.c. potential applied to a plurality of varactors provided therein, the input circuit being interposed between a receiving antenna and an interstage circuit of the tuner and including a first stage and a second stage, the first stage being connected to the receiving antenna for selecting the desired channel and the second stage including a r-f amplifier for amplifying signals of the desired channel, wherein said first stage comprises:

a varactor;

first and second inductive elements which are connected in series with each other and in parallel with the varactor and forming a resonance circuit therewith for selecting a desired lower channel, the second inductive element having at least one tap connected to the second stage for transmitting signals of the desired lower channel;

a third inductive element connected to a junction of the first and the second inductive elements and connected in series with the first inductive element and forming therewith a parallel resonance circuit with the varactor for selecting a desired higher channel;

first switching means interposed between the junction and the second stage and being operable to conduct for transmitting the desired higher channel therethrough to the second stage;

a capacitor connected in series with the third inductive element and forming a wave trap therewith; and

a second switching means interposed between the junction and the wave trap and being rendered conductive when receiving the desired higher channel for passing the same, and the first and the second switching means being rendered non-conductive when receiving the desired lower channel.

4,023,107

SEQUENTIAL CHANNEL TUNING SYSTEM WITH A MEMORY

Akio Tanaka, Chicago, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Oct. 14, 1975, Ser. No. 621,911

Int. Cl.² H04B 1/26

U.S. Cl. 325—464 **4 Claims**

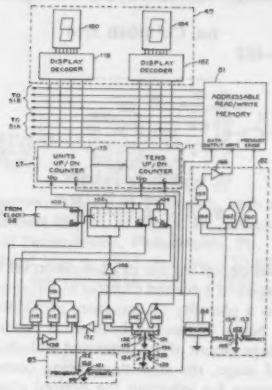
1. An all electronic television tuning system having a program mode for sequentially tuning to all channels in the discontinuous television frequency band and an operate mode for sequentially tuning to only preselected desired channels, tuning in both modes being accomplished by deriving FCC allocated channel numbers based upon the local oscillator frequency and responding to differences between derived channel numbers and generated channel numbers for adjust-

ing the oscillator frequency to change system tuning as a function thereof, including:

a counter for generating sequential two digit channel numbers for all said television channels;

a two digit indicator communicating to a viewer the channel number corresponding to system tuning;

a memory coupled to said counter and having individual



storage locations addressable in said program mode by said channel numbers for storing signals identifying desired channel numbers; and

stopping means connected between said counter and said memory for interrupting the generation of sequential two digit channel numbers in said operate mode whenever a generated channel number addresses a storage location at which an identifying signal is stored.

4,023,108

ELECTRONICALLY CONTROLLABLE TUNING DEVICE HAVING A FREQUENCY SYNTHESIZER

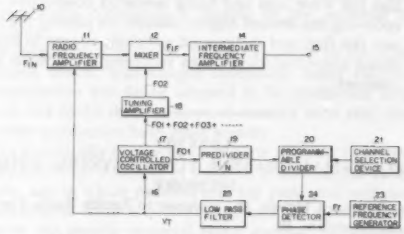
Kenichi Torii, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Jan. 21, 1976, Ser. No. 650,975

Claims priority, application Japan, Jan. 23, 1975, 50-9324

Int. Cl.² H04B *1/16*

U.S. Cl. 325—464 **8 Claims**



1. An electronically controllable tuning device having a frequency synthesizer comprising:

a radio frequency amplifier adapted to tune in an electromagnetic wave to be received and amplify it;

a frequency mixer for converting an output frequency of said radio frequency amplifier to an intermediate frequency;

a first voltage controlled oscillator adapted to simultaneously generate a fundamental wave of a predetermined frequency and higher harmonic components of the fundamental wave and to have the frequency of the fundamental wave controlled by a control voltage;

a local oscillation signal supply circuit for supplying one of the higher wave components as a local oscillation signal to said mixer;

a programmable frequency divider adapted to receive from said first voltage controlled oscillator an output of lower frequency than that of one of said higher harmonic components and frequency divide it;

a channel selection device for controlling the frequency division ratio of said programmable frequency divider;

a reference frequency generator;

a phase detector for effecting a comparison in phase between the output of said programmable frequency divider and the output of said reference frequency generators; and

a low pass filter adapted to feed a low frequency output component of said phase detector back to said first voltage controlled oscillator for controlling the output frequency of said first voltage controlled oscillator.

4,023,109

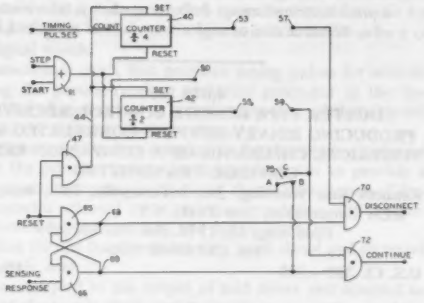
SEQUENCE CONTROL SYSTEM WITH TIMED OPERATIONS

Richmond B. Shreve, Shaker Heights, Ohio, assignor to The Van Epps Design and Development Co., Inc., Cleveland, Ohio

Filed Aug. 14, 1975, Ser. No. 604,795

Int. Cl.² H03K *17/00, 21/34;* G08B *23/00*

U.S. Cl. 328—75 **10 Claims**



1. A logic circuit for determining the completion within an allotted time of one of a series of sequential operations comprising

means for responding to a signal indicating the start of said allotted time and to a series of timing signals thereafter by providing an output signal indicative of the passage of said allotted time for completion of an operation,

bistable latch means for receiving and storing a signal indicating the completion of said operation, and

gate means coupled to said latch means and to said timing signal responsive means for providing a signal indicating the sequence of occurrence of said operation completion signal and said allotted time passage signal.

4,023,110

PULSE COMPARISON SYSTEM

Calvin W. Oliver, Kernersville, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

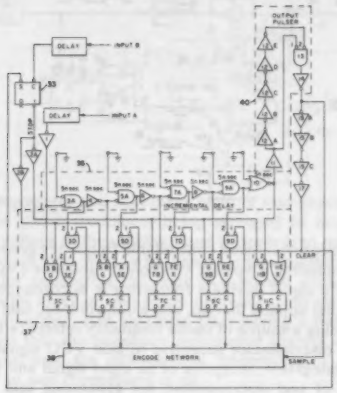
Filed Dec. 4, 1975, Ser. No. 637,792

Int. Cl.² H03K *5/20*

U.S. Cl. 328—109 **1 Claim**

1. In a system for comparing a first pulse input, with a second pulse input with respect to time, the improvement

comprising a plurality of incremental delay means connected to the first input; a series of settable gate means connected to said incremental delay means so as to successfully set said series of gate means in accordance to the travel of said first input through the incremental delay means; first connecting means connected between the second input and said series of settable gate means so as to inhibit any further setting of said gate means upon receiving a signal from said second input; encoding means connected to said series of settable gate means so as to indicate the condition of said settable gate

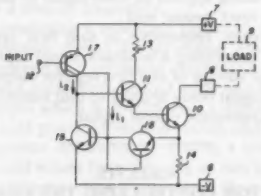


means said series of settable gate means is a series of flip-flops; said incremental delay means having a series connection of delay devices each individually connected to a separate one of said series of flip-flops; first and second delay means; said first delay means being connected between said first input and said incremental delay means; said second delay means being connected between said second input and said series of settable gate means; and a pulser means connected to the output of the incremental delay means and connected to said encoding means so as to cause said encoded means to produce an output.

4,023,111
CURRENT LIMITING DRIVER CIRCUIT

Helge H. Mortensen, Munich, Germany, assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed June 3, 1976, Ser. No. 692,251
Int. Cl.² H03F *1/08*; H03K *5/08*
U.S. Cl. 330—28 **5 Claims**



1. An amplifier circuit having a limited and well defined output current and a large dynamic output voltage range comprising:

an output stage including output transistor means having emitter, base and collector terminals, means for coupling said collector terminal to a load element whereby said load element may be energized in combination with a power supply from said output stage, current sensing resistor means coupled to said emitter whereby said current sensing resistor means develops a potential proportional to the current in said load element,

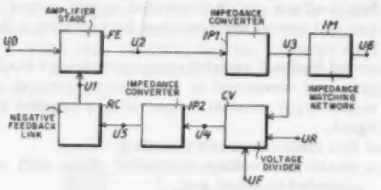
a feedback stage including a common emitter connected transistor having a base terminal and collector terminal, said collector terminal being coupled to said output stage base terminal and said base terminal coupled by means of a forward biased diode to said output stage emitter terminal and said current sensing resistor, and

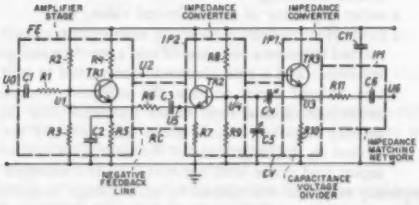
a driver stage including dual collector common emitter connected transistor means having a base terminal and two collector terminals, said base terminal being coupled to comprise the input of said amplifier, one of said collector terminals being coupled to said base terminal of said output transistor and the collector terminal of said feedback stage transistor, and the other of said collector terminals being coupled to the base of terminal of said feedback stage transistors whereby said output current is sharply limited at a predetermined value.

4,023,112
BROAD BAND AMPLIFIER HAVING NEGATIVE FEEDBACK AND A CONTROLLABLE AMPLIFICATION FACTOR

Bodo Kurt Adolf Duncker, Varmdo, and Bo Sören Tage Eberstein, Hagersten, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed June 12, 1975, Ser. No. 586,199
Claims priority, application Sweden, July 26, 1974, 097031/74
Int. Cl.² H03G *3/30*
U.S. Cl. 330—29 **9 Claims**





1. A broad band amplifier having negative feedback and a controllable amplification factor comprising:

an amplifier stage with constant amplification factor and having an input adapted to receive a signal to be amplified and an output;

a first impedance converter having a high impedance input and a low impedance output, the input being connected to the output of said amplifier stage for converting the high impedance output from said stage to a low impedance output;

a capacitive voltage divider including variable capacitor means and having a first input connected to the output of said first impedance converter and an output;

a second impedance converter having a high impedance input connected to the output of said capacitive voltage divider and a low impedance output; and

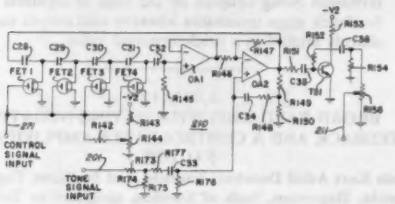
connecting means for connecting the output of said second

impedance converter to the input of said amplifier stage for controlling the negative feedback of the amplifier in dependence on the capacitance of the capacitor means in said capacitive voltage divider, whereby the amplification factor of the amplifier can be controlled.

4,023,113
VOLTAGE CONTROLLED FILTER

Robert G. Mathias, Brookfield, Ill., assignor to Hammond Corporation, Chicago, Ill.

Division of Ser. No. 447,907, March 4, 1974, Pat. No. 3,906,830. This application July 28, 1975, Ser. No. 599,867
Int. Cl.² H03F *1/36*
U.S. Cl. 330—107 **2 Claims**



1. A voltage controlled filter comprising:

an amplifier having a first input terminal for receiving an audio signal with a plurality of harmonic components, a second input terminal for receiving feedback signals and an output terminal;

a first feedback circuit connected to said output terminal and said second input terminal for providing a first feedback signal;

a second feedback circuit having a preselected fixed impedance and connected to said output terminal and said second input terminal for providing a negative feedback signal;

said first feedback circuit including:

a plurality of voltage controlled phase shift networks cascaded in series; and,

a control voltage input connected in common to each of said phase shift networks; each of said phase shift networks including:

a series capacitor of a preselected value; and,

a field effect transistor having a sourcedrain circuit connected between a terminal of said capacitor and ground reference and a gate electrode connected to said control voltage input so that the effective sourcedrain resistance of said field effect transistor and the frequency response of said phase shift network are controlled by the magnitude of the voltage at said control input; said phase shift networks set at a selected frequency response determined by said voltage magnitude at said control input provide said first feedback signal shifted substantially 180° in phase and said second feedback circuit provides said negative feedback signal, said phase shifted first feedback signal and said negative feedback signal combine producing a peak frequency response of said filter for said audio input signal components at said selected frequency;

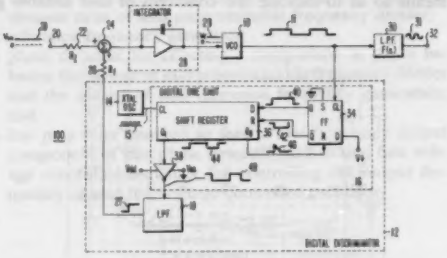
said phase shift networks substantially block said first feedback signal at a frequency lower than said selected frequency and said second feedback circuit provides said negative feedback signal for limiting the gain of said amplifier producing a level frequency response of said filter at said lower frequency; and

said phase shift networks provide progressively more of said first feedback signal at a frequency higher than said selected frequency and said second feedback circuit provides said negative feedback signal, said first feedback signal and said negative feedback signal combine producing a rapidly diminishing frequency response of said filter at said higher frequency.

4,023,114
STABLE WIDE DEVIATION LINEAR VOLTAGE CONTROLLED FREQUENCY GENERATOR

Lewis Donald Meixler, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,718
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A **6 Claims**



1. In a linear wide-band controllable frequency generator of the type including a voltage controlled oscillator (VCO) for generating a signal having a frequency in accordance with a control signal applied thereto, and a control loop, said control loop including a source of stable frequency reference signal, a frequency discriminator receptive of said VCO signal, and a summing integrator, receptive of an input signal and the output signal of said discriminator, for generating said control signal,

the improvement wherein said frequency discriminator comprises:

shift register means including a plurality of stages in a succession and including reset means for resetting the content of said stages to a predetermined value in response to a reset signal, the first stage in said succession admitting new content and each successive stage receiving the previous content of the next prior stage in said succession responsive to each cycle of said stable frequency reference signal, said shift register means providing first, and second register output signals indicative respectively of the content of said first stage and of the content of said last stage; said first and second register output signals alternating in voltage between first and second predetermined levels;

bistable means, for generating a first output signal in response to said VCO signal and a second output signal in response to said second register output signal, said bistable means first output signal being applied to said shift register means for admission as new content to the first stage in said succession, said bistable means second output signal being applied as reset signal to said shift register means reset means; and

averaging means, responsive to said first register output signal, for generating a feedback signal representative of the average voltage of said first register output signal, said feedback signal being applied to said summing integrator as said dicriminator output signal.

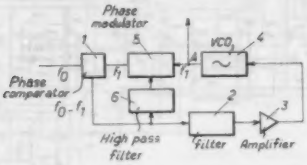
4,023,115
MEANS FOR CONTROLLING THE PHASE OR FREQUENCY OUTPUT OF AN OSCILLATOR IN A LOOP CIRCUIT

Michel Jacques Robert Nicolas, Paris, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed July 31, 1975, Ser. No. 600,779
Int. Cl.² H03B *3/04*
U.S. Cl. 331—17 **6 Claims**

1. A device for controlling the phase or frequency output of an oscillator by an input signal, comprising a voltage con-

trolled oscillator, a phase comparator with two inputs and one output, means for applying said input signal to an input of said comparator, a phase modulator, means including said phase modulator for applying the output signal of said voltage controlled oscillator to the other input of said comparator, a filter, connection means including the above cited means for establishing in the order named a phase locked loop comprising said comparator and, beginning from the output of said comparator, said filter, said voltage controlled oscillator, said



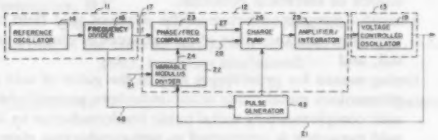
phase modulator and said other input of said phase comparator, said phase modulator being arranged to modulate the output voltage of the oscillator and to apply it to said comparator, a high pass filter, with limited phase rotation and with means for connecting the same as a branch circuit between the control input of said phase modulator and the output of said comparator, said high pass filter having a transfer function such that the imaginary component thereof is not cancelled out until the difference in frequencies of the signals applied to said comparator is nil.

4,023,116

PHASE-LOCKED LOOP FREQUENCY SYNTHESIZER

Peter H. Alfke, Los Altos Hills; Charles H. Alford, Santa Clara, and Eric G. Breeze, Los Altos, all of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed July 8, 1976, Ser. No. 703,394
Int. Cl.² H03B *3/04*
U.S. Cl. 331—17 **11 Claims**



1. A phase-locked frequency synthesizer comprising the combination of:

means for producing an electrical oscillation output in the range of a desired frequency;

means for producing a reference electrical oscillation;

phase correction means for detecting any difference in phase between said reference electrical oscillation and a comparison oscillation derived from said electrical oscillation output which is greater than a difference in a dead band of said phase correction means and responding to such a greater difference by issuing a phase correction signal to said means for producing an electrical oscillation output selected to change the phase thereof to be essentially consonant with the phase of said reference electrical oscillation; and

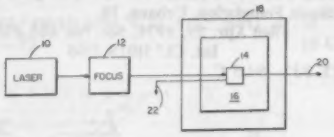
an electrical signal generator adapted to direct an intentional phase change signal to said phase correction means representative of a difference in phase between said reference and comparison oscillations greater than said dead band difference to cause said phase correction means to issue a phase correction signal to said means for producing an electrical oscillation output whereby said dead band of said phase correction means is avoided.

4,023,117

STIMULATED RAMAN SCATTERING RESONATOR

William J. Schade, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 3, 1976, Ser. No. 654,824
Int. Cl.² H01S *3/10*
U.S. Cl. 331—94.5 N **6 Claims**



1. A stimulated Raman scattering resonator comprising:

a. Raman scattering means for receiving optical pump irradiance,

b. reflecting means contiguous with one surface of said scattering means,

c. focusing means contiguous with another surface of said scattering means for focusing said optical pump irradiance onto said reflecting means,

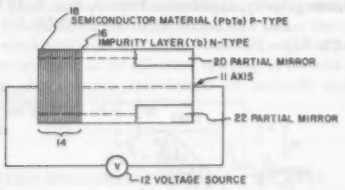
d. said focusing means having a partially transmitting portion through which substantially all of said stimulated Raman scattering passes when reflected by said reflecting means.

4,023,118

SUPERHETEROJUNCTION LASER

Bernard V. Kessler, Greenbelt, and Gerald F. Hoff, Ashton, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 24, 1975, Ser. No. 561,461
Int. Cl.² H01S *3/00;* **H01L** *33/00*
U.S. Cl. 331—94.5 H **11 Claims**



6. A superheterojunction laser device for producing a combined laser beam having good geometric confinement and which can be steered in space, comprising:

a boule of semiconductor material;

periodic striated layers of impurity ions formed in said boule in densities sufficient to create P-N junctions at each of the layers by the application of a standing wave ultrasonic field of predetermined frequency aligned along the direction of movement while said boule is pulled at a predetermined rate from a melt containing P-type and N-type conductivity impurity ions whereby the periodic striae form a multiplicity of P-N junctions;

partial mirror means covering at least part of said cylindrical boule;

variable frequency voltage source means in excess of the Zener voltage of said P-N junctions connected across opposite axial ends of said boule for causing an injection current signal to flow through said multiplicity of P-N junctions causing the forward biased of said junctions to produce a signal laser output

bean coplanar with its junction source such that the combination of single laser output beams produces a narrow combined laser beam;

wherein said injection current signal produced by said vari-

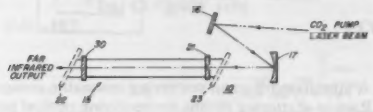
able voltage source can be varied in wavelength to progressively change the phase of said injection current signal at each of said multiplicity of P-N junctions to effect a steering of said narrow combined laser beam.

4,023,119

LASER OUTPUT COUPLER

Edward J. Danielewicz, Jr., Urbana, Ill., assignor to University of Illinois Foundation, Urbana, Ill.

Filed Apr. 29, 1976, Ser. No. 681,425
Int. Cl.² H01S *3/08*
U.S. Cl. 331—94.5 C **16 Claims**



1. In a far infrared laser apparatus comprising a laser cavity, a lasing medium disposed in said cavity, first and second opposing reflecting surfaces, and means for introducing a beam of pumping infrared radiation; an improved output coupler serving as one of said first and second opposing surfaces, comprising:

a metal layer having a multiplicity of apertures therein; and

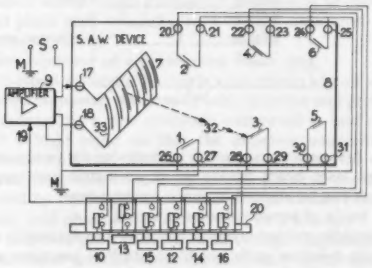
at least one layer of dielectric material disposed over said metal layer, said dielectric material being selected to be substantially reflective of infrared radiation and substantially transmitting of far infrared radiation.

4,023,120

SURFACE WAVE PROGRAMMABLE OSCILLATOR

Pierre Hartemann, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 27, 1976, Ser. No. 662,258
Claims priority, application France, Apr. 2, 1975, 75.10228
Int. Cl.² H03H *9/26, 9/32;* **H03B** *5/32*
U.S. Cl. 331—107 A **4 Claims**



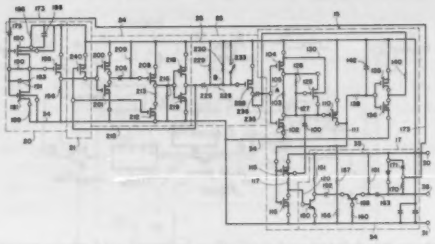
1. A surface wave programmable oscillator comprising: a frequency selective transmission system, ampifier means having respective input and output terminals, and N positions switching means; said frequency selective transmission system comprising a piezoelectric substrate, an electromechanical transducer array for launching along the surface of said substrate a beam of ultrasonic energy, and a set of N auxiliary surface wave transducers arranged on said surface in fantail fashion for successively collecting said beam of ultrasonic energy; one of said terminals being connected to said electromechanical transducer array, and the other of said terminals being connected through the agency of said N positions switching means respectively to said N auxiliary surface wave transducers; said electromechanical transducer array comprising electrode means in the form of interdigitated comb shaped structures with curvilinear teeth.

4,023,121

OSCILLATOR FOR DEMAND HEART PACER

Lawrence Everett Alley, III, North Easton, Mass., assignor to ARCO Medical Products Company, Leechburg, Pa.

Continuation of Ser. No. 430,827, Jan. 4, 1974, Pat. No. 3,926,197. This application Sept. 16, 1975, Ser. No. 613,819
Int. Cl.² H03K *3/353;* **A61N** *1/36*
U.S. Cl. 331—111 **6 Claims**



1. An oscillator comprising:

a pair of complementary metal oxide semiconductors, each having a source, a gate, and a drain,

said gates being interconnected, and the respective sources of which being connectable to terminals of opposite polarity of a source of electric potential,

a resistor interconnected between the drains of said complementary metal oxide semiconductors,

a capacitor connected at one side to the drain of one said complementary metal oxide semiconductors,

means connecting said capacitor at its other side to said source of said complementary metal oxide semiconductor to the drain of which said one side of said capacitor is connected,

a field effect transistor, having a source, a gate, and a drain,

said gate being connected to the drain of said complementary metal oxide semiconductor to which said one side of said capacitor is connected,

said source being connected to one of said terminals of said source of electrical potential,

a resistor connected between the drain of said field effect transistor and the other of said sources of electric potential, and

timing means for providing a bias to the gates of said complementary metal oxide semiconductors normally biasing said complementary metal oxide semiconductor to which said capacitor is connected to non-conducting state, and to bias the other of said complementary metal oxide semiconductors to a conducting state, whereby when said capacitor charges to the threshold voltage of said field effect transistor, said field effect transistor is biased into a non-conducting state, thereby initiating said timing means to apply a bias voltage of opposite polarity from said normal biasing to bias said complementary metal oxide semiconductor to which said capacitor is connected to a conducting state, and the other complementary metal oxide semiconductor to a non-conducting state, thereby discharging said capacitor.

4,023,122

SIGNAL GENERATING CIRCUIT

Toshio Oura, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed Jan. 23, 1976, Ser. No. 651,697
Claims priority, application Japan, Jan. 28, 1975, 50-12164; Jan. 28, 1975, 50-12165
Int. Cl.² H03K *3/353, 4/06*
U.S. Cl. 331—111 **5 Claims**

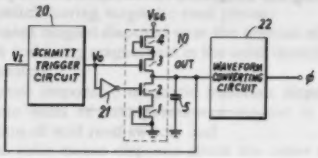
1. A signal generating circuit comprising:

means for generating a signal having first and second levels

in response, respectively, to a portion of an input signal above a first voltage level at the rise of said input signal and to a portion of said input signal below a second voltage level at the fall of said input signal;

means connected to said signal generating means for inverting the output of said signal generating means;

a switching circuit including first and second circuits, each of which includes an enhancement-type insulated-field effect transistor and a depletion-type insulated-gate field



effect transistor, said first and second circuits being serially connected between the first and second terminals of a power source and connected to each other at a junction point, the output of said signal generating mean and the output of said inverter means being applied respectively to the gates of said enhancement-type transistors of said first and second circuits;

a capacitor connected to said junction point of said first and second circuits; and means connected the input of said signal generating means to said junction point.

4,023,123

MICROSTRIP REVERSE-PHASED HYBRID RING COUPLER

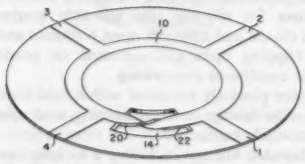
John Reindel, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 3, 1975, Ser. No. 546,369

The portion of the term of this patent subsequent to Apr. 13, 1993, has been disclaimed.

Int. Cl.² H01P *5/16*

U.S. Cl. 333—11 **14 Claims**



1. A microwave directional coupler comprising:

a dielectric material having first and second sides;

a plurality of interconnected electrical conductors each of a predetermined electrical length fixed to said first side of said dielectric material;

a ground plane conductor fixed to said second side of said dielectric material;

a phase reversal transmission line connected to two of said plurality of electrical conductors comprising first and second adjacent, substantially parallel conductors each having first and second sides and each being twisted 180° whereby said phase reversal transmission line introduces a 180° phase reversal to microwave signals propagating therethrough.

4,023,124

ACOUSTIC SURFACE WAVE DEVICES

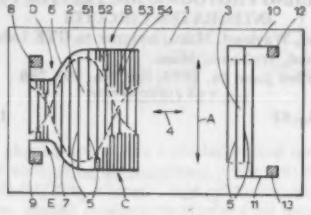
David William Parker, Reigate; David Edward Penna, Earlwood; Frederick Warren Smith, Sutton, and Richard Stevens, Copthorne, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 29, 1975, Ser. No. 600,148

Claims priority, application United Kingdom, Aug. 2, 1974, 34190/74

Int. Cl.² H03H *9/04, 9/26, 9/32;* **H01L** *41/10*

U.S. Cl. 333—72 **18 Claims**



1. An acoustic surface wave device comprising a body of piezoelectric material on one surface of which is formed a transducer including an interdigital array of two sets of electrodes with each set connected to one of two opposite bus bars, each electrode of a set of electrodes having a part which overlaps a part of an adjacent electrode of the opposite set and with the overlapping electrode parts having an effective spacing of a half wavelength of acoustic surface waves at a frequency f_o, the length of the overlapping electrode parts varying along the line of acoustic surface wave propagation through the transducer with the limits of the envelope of the overlapping electrode parts normal to the propagation line defining the acoustic aperture of the transducer, and at least one group of conductive strips normal to the propagation line, which strips extend outside said envelope and within the aperture and are electrically connected in common, adjacent strips within the group being at an effective spacing of an odd integral multiple of a quarter wavelength of acoustic surface waves at the frequency f_o.

4,023,125

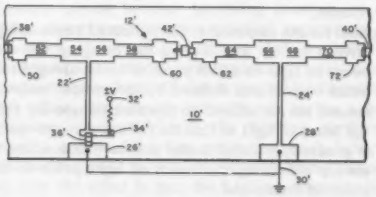
PRINTED BROADBAND RF BIAS CIRCUITS

Allen Robert Wolfe, Sauquoit, N.Y., assignor to General Electric Company, Utica, N.Y.

Filed Oct. 17, 1975, Ser. No. 622,921

Int. Cl.² H01P *5/00*

U.S. Cl. 333—84 M **4 Claims**



1. A printed rf circuit for providing a D.C. bias path to an rf transmission line with minimum attenuation of a broadband rf signal on said line, comprising, in combination:

a high impedance printed stub conductor connected to a ground point in said rf circuit;

a plurality of printed signal conductors connected in series with each other and in series with said rf transmission line, with one of said signal conductors being connected to said stub conductor at the end of said stub opposite

said ground point and forming a network of rf conductors, said printed signal conductors in the branch circuit between said stub conductor and said rf transmission line having different line length and impedance values, said line length and impedance values being selected to provide substantially the maximum voltage transmission coefficient across said signal conductors over the frequency range of said broadband signal; and

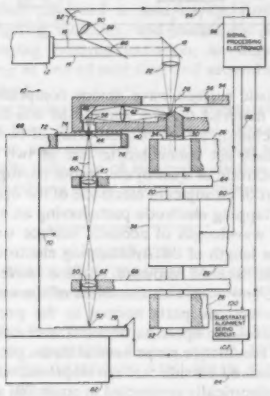
means for coupling a D.C. bias potential to said ground point.

4,023,126

SCANNING PHOTOGRAPHIC PRINTER FOR INTEGRATED CIRCUITS

John Schlafer, Wayland, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed June 26, 1975, Ser. No. 590,788
Int. Cl.² G03B *27/70*
U.S. Cl. 355—51 **11 Claims**



1. A scanning photographic printer for integrated circuits comprising:

a source of a beam of light generally transmitted and centered along an optical axis;

a first fixture which is rotatable about an axis of rotation and which includes

a first mirror which is adjacent and inclined to the axis of rotation of the first fixture and affixed thereto, the first mirror being inclined also to the optical axis so that at least a portion of light is reflected away from the axis of rotation and is scanned through a sector as the mirror rotates,

optical means disposed in the reflected beam of light and affixed to the first fixture for bringing the reflected beam of light to a first point of focus along a reflected beam optical axis defined by the optical means,

a second mirror affixed to the first fixture for reflecting the beam of light so that the reflected beam optical axis is generally parallel to the axis of rotation, the second mirror reflecting the beam of light prior to the first point of focus, and

a unitary power, nonreversing optical system aligned along the reflected beam optical axis beyond the first point of focus for bringing the reflected beam of light to a second point of focus;

a second fixture which is radially translatable relative to the rotating first fixture and which includes

means for positioning a partially transparent mask generally orthogonal to the reflected beam optical axis in the vicinity of first point of focus, and

means for positioning an integrated circuit substrate to be photographically printed generally orthogonal to the reflected beam optical axis in the vicinity of the second point of focus; and

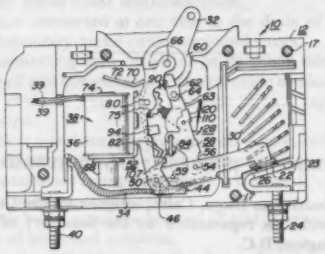
means for translating the second fixture relative to the first fixture at a predetermined rate which is directly proportional to the velocity at which the reflected beam of light is scanned across the surface of the substrate, whereby the image of the mask is sequentially imposed on the integrated circuit substrate thereby photographically exposing the integrated circuit substrate.

4,023,127

CIRCUIT BREAKER WITH CONTACTS WHICH ARE NOT ENGAGEABLE WHEN THE ELECTRICAL SENSING UNIT THEREOF IS ENERGIZED

Charles Mune, Trenton, N.J., assignor to Heinemann Electric Company, Trenton, N.J.

Filed Sept. 11, 1975, Ser. No. 612,373
Int. Cl.² H01H *9/20, 75/00*
U.S. Cl. 335—172 **9 Claims**



1. A circuit breaker comprising

a case,

a stationary contact mounted within said case,

a movable contact within said case and movable into and out of engagement with said stationary contact,

a mechanism for moving said movable contact to the contacts closed and contacts open positions and for electrically tripping open said contacts on predetermined electrical conditions comprising

an operator pivotally mounted within said case

a collapsible linkage interconnecting said operator and said movable contact,

said collapsible linkage including a locking device maintaining said linkage rigid when said locking device is latched,

electromagnetic means for collapsing said collapsible linkage upon predetermined electrical conditions to move said contacts from the contacts closed position to the contacts open position,

said electromagmetic means including an armature movable upon predetermined electrical conditions to an actuated position, and

said armature including first means for collapsing said collapsible linkage upon predetermined electrical conditions and second means restraining said locking device from relatching when said armature is in its actuated position and said collapsible linkage has moved toward the contacts open position to the maximum extent possible but for said second means.

4,023,128

TEMPERATURE RESPONSIVE REED SWITCH

Tomio Itou; Michio Ishikawa, and Tokio Furuse, all of Tokyo, Japan, assignors to TDK Electric Co., Ltd., Tokyo, Japan

Filed Feb. 20, 1976, Ser. No. 659,937

Claims priority, application Japan, Oct. 23, 1975, 50-144983[U]

Int. Cl.² H01H 37/32

U.S. Cl. 335—208 6 Claims

1. A temperature responsive reed switch comprising:

a reed switch having magnetic reed pieces;

a permanent magnet disposed near the contact of said reed switch and being magnetized in the axial direction of said reed switch;

temperature responsive magnetic materials disposed upon opposite sides of said permanent magnet in the axial direction of said reed switch; and

magnetic yoke means disposed about the outer surface of said temperature responsive magnetic materials and said permanent magnet for physically and magnetically protecting said materials and said magnet, and in contact with the said materials for absorbing and radiating heat from and to said materials.

4,023,129

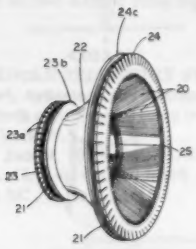
DEFLECTION YOKE WITH NON-RADIAL CONDUCTORS

Jerrold Kerwin Kratz, and Edward Walter Christensen, II, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,968

Int. Cl.² H01F 7/00

U.S. Cl. 335—210 5 Claims



1. A deflection yoke, conductors of which lie along nonradial paths with respect to the central longitudinal axis of said yoke, comprising:

an annular core;

first and second sets of grooves circumferentially spaced and disposed at the respective entrance and exit portions of said core;

a third set of circumferentially spaced grooves disposed about the inner surface of said core at a position between said entrance and exit portions of said core; and

a conductor wound in a plurality of turns relative to said core for forming horizontal and vertical deflection coil portions, at least some of the conductor turns extending along the inside surface of said core engaging respective grooves of each of said first, second and third sets of said grooves for fixedly retaining said conductor turns along respective nonradial paths relative to said axis between said first and third and said third and second sets of grooves.

4,023,130

PIVOTED ARM CONTROL ARRANGEMENTS

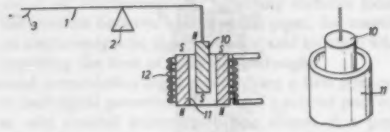
Keith Douglas Ridler, Cambridge; Gordon Malcolm Edge, Saffron Walden, and Robert Charles Whelan, Comberton, all of England, assignors to Strathearn Audio Limited, Belfast, Northern Ireland

Filed Apr. 24, 1975, Ser. No. 571,432

Claims priority, application United Kingdom, Apr. 30, 1974, 18841/74

Int. Cl.² H01F 7/00; G11B 3/10

U.S. Cl. 335—219 7 Claims



1. In a phonograph having a pivoted pickup arm, apparatus for use in controlling the movement of the arm about a pivot point including first magnetic field producing means coupled to the arm, second magnetic field producing means arranged to produce a magnetic field which acts upon the first magnetic field producing means to produce rotation of the arm about the pivot point and means to produce a third magnetic field, the third magnetic field being arranged to modify the effect of the second magnetic field producing means upon the first magnetic field producing means, thereby to modify the said rotation of the arm.

4,023,131

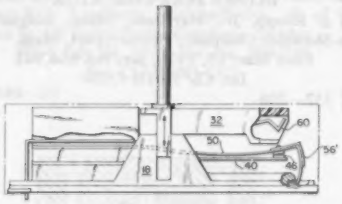
ELECTRIC CIRCUIT BREAKER WITH AMBIENT TEMPERATURE COMPENSATING MEANS

Frederick C. Seiden, Holmes Beach, Fla., assignor to Workman Electronic Products, Inc., Sarasota, Fla.

Filed Feb. 26, 1976, Ser. No. 661,568

Int. Cl.² H01H 71/16

U.S. Cl. 337—67 8 Claims



1. Electric circuit breaker providing overcurrent and/or excessive ambient temperature protection comprising:

A. a base member having a latching platform thereon;

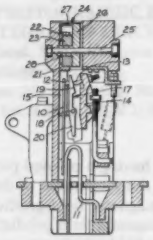
B. flexible actuator and conductor contact arms, said arms being set upon the platform in spaced apart relation to each other, the actuator contact arm having a latching extension, engageable with the latching platform; the actuator arm and latching extension each being comprised of bimetals, each having distinguishing characteristics over the other in that the latching extension is unaffected by current flow, whereas the actuator extension is affected by current flow and ambient temperature change;

C. actuator arm compression return means, operatively disposed with respect to the said actuator contact arm, whereby an increase in pressure between electrical contacts is effected as the temperature may be increased up to the point of break, resulting in improved contact life and more effective contact as the circuit breaker may be subjected to external vibrations.

4,023,132
ELECTRICAL CIRCUIT BREAKERS

Alan Lister Kidd, Southport; Douglas Eaves, Blackpool, and Keith Walmsley, Preston, all of England, assignors to Dorman Smith Switchgear Limited, Preston, England

Continuation-in-part of Ser. No. 505,223, Sept. 12, 1974, Pat. No. 3,943,477. This application Dec. 8, 1975, Ser. No. 638,705
Claims priority, application United Kingdom, Oct. 4, 1973, 46290/73
Int. Cl.² H01H 73/22
U.S. Cl. 337—82 2 Claims

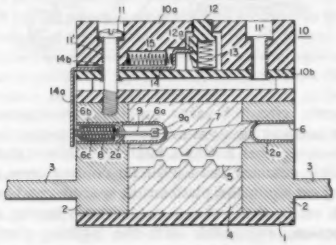


1. In an electric overload protection apparatus including a thermal element which on being heated by a fault current is deflected to enduce a pivotal movement of a trip bar and thus a circuit-breaking tripping of the apparatus, the improvement in means for varying the apparatus rating comrpising:
   a slide displaceable relative to the thermal element to vary the amount by which said thermal element must deflect to cause said tripping,
   a recessed manually-operable knob supported for rotative movement relative to the slide, and
   an adjustable boss mounted eccentrically relative to the knob and in the recess thereof with rotation of the knob effecting displacement of the slide.

4,023,133
BLOWN FUSE INDICATOR

Edward J. Knapp, Jr., Merrimac, Mass., assignor to The Chase-Shawmut Company, Newburyport, Mass.

Filed Mar. 15, 1976, Ser. No. 666,942
Int. Cl.² H01H 85/30
U.S. Cl. 337—206 4 Claims



1. In combination
   a. an electric fuse having a cylindrical casing and a first blown fuse indicator including a first blown fuse indicating pin means of relatively small size arranged adjacent one of the end surfaces of said fuse and movable in a direction longitudinally of the axis of said casing;
   b. an insulating socket arranged adjacent to the lateral surface of said casing and affixed to said casing;
   c. a second blown fuse indicator supported by said socket, said second blown fuse indicator including a second blown fuse indicating pin means of relatively large size, a helical compression spring biasing said second pin means at right angles to the general plane defined by said socket, and a latch under the action of an additional spring normally restraining said second pin means; and
   d. means responsive to operation of said first pin means for operating said latch against the action of said additional spring to cause operation of said second pin means under the action of said helical spring.

4,023,134
ELECTRIC FUSE HAVING MULTIPLE CURRENT PATHS CONNECTED IN PARALLEL

Kenneth W. Swain, North Hampton, N.H., assignor to Gould Inc. Electric Fuse Division, Newburyport, Mass.

Filed May 10, 1976, Ser. No. 684,755
Int. Cl.² H01H 85/04
U.S. Cl. 337—293 3 Claims

1. An electric fuse including
   a. a tubular casing of electric insulating material having rims at the ends thereof;
   b. a pulverulent arc-quenching filler inside said casing;
   c. a pair of ferrules mounted on the ends of said casing each having an axially inner end surface; and
   d. a plurality of fusible elements forming parallel current paths extending from one of said pair of ferrules to the other of said pair of ferrules, one end of each of said plurality of fusible elements being conductively connected to the center region of said axially inner end surface of one of said pair of ferrules and the other end of each of said plurality of fusible elements being conductively connected to the other of said pair of ferrules at the interface between one of said rims of said casing and said axially inner end surface of said other of said pair of ferrules, and said plurality of fusible elements forming a self-sustained structural unit adapted to be telescoped in one single operation into said casing of the fuse.

4,023,135
APPARATUS FOR DETECTING THE NUMBER OF OBJECTS

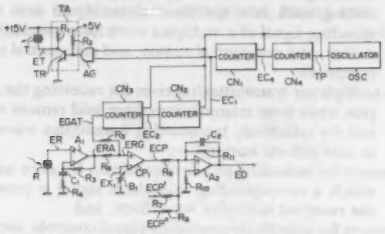
Hisao Hanmura, Hitachi; Nobuo Satou, Iwaki; Shigeyoshi Kawano, Hitachiota; Tatsuo Iwasaka, and Hiroshi Kinoshita, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 15, 1975, Ser. No. 613,500

Claims priority, application Japan, Sept. 20, 1974, 49-107744

Int. Cl.² G01S 9/66

U.S. Cl. 340—1 R **11 Claims**



1. An apparatus for detecting the number of objects comprising first means for emitting an ultrasonic wave signal toward said objects, second means for receiving a reflection wave signal from said objects and converting the latter to a first electric pulsating signal including pulses representative of each of said objects, third means for generating a reference level signal, wave shaping means having respective input terminals connected with said second means and said reference level setting means for producing a second electric pulsating signal including all those pulses of said first electric pulsating signal having peak values higher than said reference level signal to the exclusion of the other pulses of said first electric pulsating signal, and means responsive to said second electric pulsating signal for producing an output signal proportional to the pulses in said second electric pulsating signal.

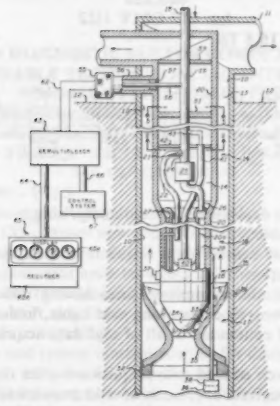
4,023,136
BOREHOLE TELEMETRY SYSTEM

David Lamensdorf, Arlington, and Alexander Murray Nicolson, Concord, both of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 585,000

Int. Cl.² G01V 1/40; H04B 1/00

U.S. Cl. 340—18 NC **6 Claims**



1. A communications system for the transmittal of data through a geothermal pumping system from a downhole location of a geothermal well to the well head thereof, comprising:

multiplicity of transducer means for converting the magnitude of selected parameters to electrical signals;

signal generator means coupled to said transducer means for generating modulated signals representative of said magnitudes of said selected parameters;

coaxial transmission line means comprising substantially coaxial metallic pipes of said geothermal pumping system for guiding electromagnetic signals therethrough;

isolation means, in electrical contact with said pipes and positioned on said coaxial transmission line at a location above all electromagnetic reflecting surfaces located in the conduit between said metallic pipes, for establishing an electromagnetic short circuit at said location while not impeding the flow of fluid therethrough;

second transmission line means having a first port coupled to said signal generator means and a second port coupled to said coaxial transmission line means at a predetermined distance above said isolation means;

third transmission line means for guiding said modulated signals between a coupling location, whereat said third transmission line means is coupled to said coaxial transmission line, and an output port of said third transmission line means; and

second isolation means, in electrical contact with said metallic pipes forming said coaxial transmission line at a predetermined distance above said coupling location, for establishing an electromagnetic short circuit thereat while not impeding the flow of fluid through the conduit between said pipes.

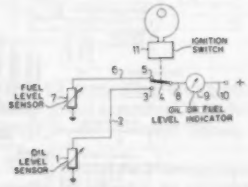
4,023,137
DEVICE FOR INDICATING THE OIL LEVEL IN A COMBUSTION ENGINE CRANKCASE

Åke Gunnar Olsbo, Torslanda; Dag Anders Windt, Kungalv, and Lars-Erik Lundberg, Hisings-Backa, all of Sweden, assignors to AB Volvo Penta, Goteborg, Sweden

Filed July 28, 1975, Ser. No. 599,730

Int. Cl.² B60Q 1/00

U.S. Cl. 340—59 **1 Claim**



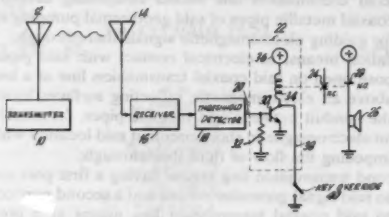
1. A device for indicating the oil level in an internal combustion engine crankcase of a motor vehicle, comprising an indicator, a first electrical sensor for detecting fuel level in said vehicle, a second electrical sensor for detecting oil level in said crankcase, an ignition lock switch for said internal combustion engine, the ignition lock switch having at least one position in which the engine ignition is switched on and at least one position in which the engine ignition is switched off, and means responsive to the position of said ignition lock switch to connect said first sensor to said indicator when the ignition lock switch assumes an ignition-on position and to connect said second sensor to said indicator only when the ignition lock switch assumes an ignition-off position, whereby said indicator indicates fuel level when the engine is running and oil level only when the engine is not running.

4,023,138

VEHICLE THEFT PREVENTION SYSTEM

Joseph Ballin, 19-50 48th St., Astoria, N.Y. 11105

Filed Nov. 17, 1975, Ser. No. 632,706
Int. Cl.² B60R *25/04*
U.S. Cl. 340—64 **6 Claims**



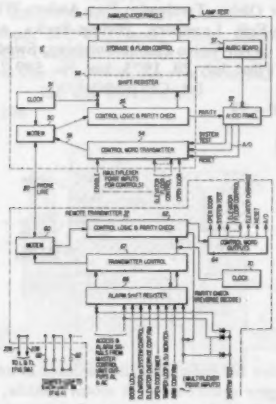
1. A vehicle theft prevention system comprising a receiver adapted to receive a signal from a transmitter located remotely therefrom, means coupled to said receiver for producing a control signal when the signal received at said receiver from the transmitter is below a predetermined level corresponding to the distance between the transmitter and receiver exceeding a predetermined amount, switch means connected to said control signal producing means and operated between a first condition to a second condition by said control signal, and theft inhibiting means including means for disabling the vehicle ignition system operatively connected to said switch means and actuated upon the operation of said switch means.

4,023,139

SECURITY CONTROL AND ALARM SYSTEM

Gene Samburg, 1206 Stable Gate Court, McLean, Va. 22101

Filed Oct. 24, 1974, Ser. No. 517,768
Int. Cl.² G08B *19/00;* **H04Q** *9/00*
U.S. Cl. 340—147 R **19 Claims**



1. A security control and alarm system having a central station communicating with at least one station for receiving signals indicating security conditions, including alarm and access conditions, sensed at the remote station and for transmitting controls to the remote station wherein:

said remote station comprises:

a master control unit communicating with plural zones to be protected, each said zone including at least one sensor device and an access switch selectively settable to a desired one of secure and access positions and operative in the access position to shunt the sensor device, said master control unit including means responsive to arming and disarming controls from said central station to establish armed and disarmed states of said unit and being enabled in said armed state to respond to activation of said sensor device,

means connecting said sensor device of each said zone to said master control unit, said master control unit, when armed, being enabled to respond to activation of said sensor device of a given said zone for the secure position of said access switch to generate an alarm signal associated with the said zone, and

a multiplex-transmitter/receiver communicating with said master control unit, said multiplexer thereof including a multiplex point for each said zone for receiving an alarm signal for the corresponding zone and for transmitting each received zone alarm signal as a corresponding signal of a multiplex wave form to said central station, and said central station, and said central station comprises:

a multiplexer-transmitter/receiver for receiving the multiplex wave form transmissions from said remote station and for selectively transmitting a multiplex wave form to said remote station,

means for indicating an alarm condition for each zone for which a corresponding said alarm signal is present in the received multiplex wave form, and

means for selectively producing plural controls, including at least said arming and disarming controls, and supplying said controls as inputs to corresponding multiplex points of said central station multiplexer-transmitter for transmission as corresponding signals of the multiplex wave form to said remote station, and said remote station further comprises:

plural devices to be controlled, including at least said means of said master control unit responsive to said arming and disarming controls, said multiplexer-receiver of said remote station producing a control output corresponding to each control signal of the multiplex wave form received from said central station, and

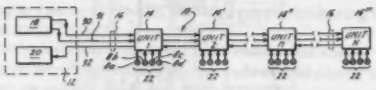
means responsive to each said control output for controlling the respectively associated device to be controlled.

4,023,140

SEISMIC DATA TELEMETERING SYSTEM

Lee E. Siems, and Paul M. Morgan, both of Houston, Tex., assignors to Western Geophysical Company of America, Houston, Tex.

Continuation-in-part of Ser. No. 576,943, May 12, 1975, Pat. No. 3,996,553. This application Mar. 8, 1976, Ser. No. 665,151
Int. Cl.² G01V *1/22*
U.S. Cl. 340—15.5 TS **28 Claims**



1. A seismic exploration system comprising:

a seismic cable;

a plurality of seismic data acquisition units spaced along said cable;

first and second transmision lines having different signal propagation velocities along said cable, included in said cable and connected to all of said data acquisition units; and

means at each of said data acquisition units responsive to signals received over both of said transmission lines for initiating a desired switching action at said data acquisition unit, wherein each said unit initiates said switching

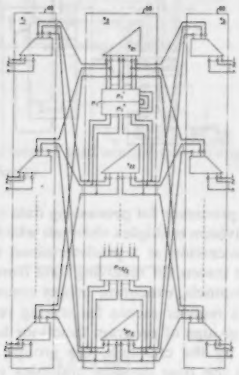
action only upon the substantially concurrent presence of said signals at said units.

4,023,141

EFFICIENT ONE-SIDED REARRANGEABLE MULTISTAGE SWITCHING NETWORK

Frank Kwangming Hwang, Piscataway Township, Middlesex County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 1, 1976, Ser. No. 691,899
Int. Cl.² H04J *3/00*; H04Q *3/68*; H04M *3/36*
U.S. Cl. 340—166 R **6 Claims**



1. A multistage switching network subdivided into a first stage, a second stage and a third stage characterized in that:
said first stage comprises an *n* plurality of input-mixed rearrangeable switches;
said second stage comprises an *n* plurality of one-sided rearrangeable switches and an *n*/2 plurality of two-sided rearrangeable switches; and
said third stage comprises an *n* plurality of output-mixed rearrangeable switches.

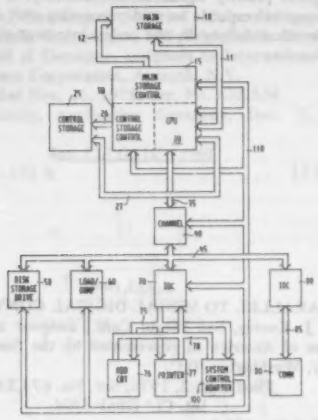
4,023,142

COMMON DIAGNOSTIC BUS FOR COMPUTER SYSTEMS TO ENABLE TESTING CONCURRENTLY WITH NORMAL SYSTEM OPERATION

Robert J. Woessner, Stewartville, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 14, 1975, Ser. No. 568,094
Int. Cl.² G06F *11/00*
U.S. Cl. 340—172.5 **19 Claims**

1. In a computer system having a central processing unit (CPU), an I/O channel unit with I/O adapters units connected thereto with at least one I/O adapter unit being a system control adapter, said units including internal storage elements connected for operation in a normal mode and connected serially as a shift ring for operation in a diagnostic mode, the improvement comprising:
means in said system control adapter for discretely addressing each unit of said computer system,
means in said system control adapter for providing a test signal to each unit of said computer system, and
means in each unit of said computer system responsive to being addressed and to receiving said test signal for inhibiting normal mode operation and enabling diagnostic



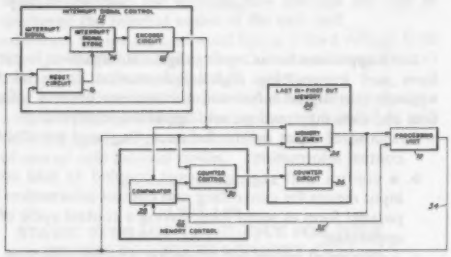
mode operation of said internal storage elements in said responsive unit.

4,023,143

FIXED PRIORITY INTERRUPT CONTROL CIRCUIT

Gerald Paul Braunstein, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Oct. 28, 1975, Ser. No. 626,570
Int. Cl.² G06F *3/04*, *9/18*
U.S. Cl. 340—172.5 **6 Claims**



1. An apparatus for controlling the transfer of interrupt signals to a processing unit according to predetermined levels of priority assigned to the interrupt signals, the apparatus comprising:
a. means for storing each of the interrupt signals, said means including means for clearing an interrupt signal in response to the processing unit accepting said interrupt signal;
b. means responsive to the storing means for generating a coded interrupt signal representing the highest priority interrupt signal contained in the storing means;
c. a last-in first-out memory having an input connected to the generating means and having an output connected to the processing unit for transferring the highest priority coded interrupt signal in the memory to the processing unit; and
d. means responsive to the generating means and the processing unit and connected to the memory for controlling the transfer of the coded interrupt signal to the memory in response to the coded interrupt signal having a priority equal to or higher than the highest priority coded interrupt signal currently in the memory, whereby the coded

interrupt signal is transferred to the processing unit, said controlling means including means for shifting the next highest priority signal in the memory to the memory output in response to said processing unit executing the operation defined by the coded interrupt signal.

4,023,144

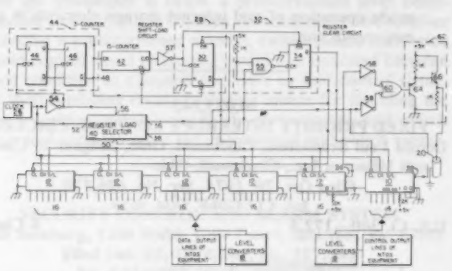
PARALLEL TO SERIAL DIGITAL CONVERTER

Harry J. Koenig, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 2, 1976, Ser. No. 673,230

Int. Cl.² G06F *5/04*

U.S. Cl. 340—172.5 **11 Claims**



1. An apparatus for accepting digital information in parallel form and transmitting digital information in serial form wherein said digital information comprises control information and data information, said apparatus comprising:

a. a control input means for accepting said parallel-form control information;

b. a control shift register means coupled to said control input means for converting said control information from parallel form to serial form during a control cycle of said apparatus;

c. a data input means for accepting said parallel-form data information;

d. a data shift register means coupled to said data input means for converting said data information from parallel form to serial form during a data cycle of said apparatus;

e. control means coupled to said control shift register means and to said data shift register means for operating said apparatus in a control cycle or a data cycle and for preventing said apparatus from operating in both cycles at the same time;

f. register selector means coupled to said control means and having its input coupled to the output of said control shift register means for responding to an instruction contained in the control information converted during a given control cycle to signal said control means to operate said apparatus in either another control cycle or a data cycle after the conclusion of the given control cycle;

g. timing means coupled to said control means for regulating the time duration of each of said data cycles;

h. a control coupling means for coupling the output of said control shift register means to the output of said apparatus;

i. a data coupling means for coupling the output of said data shift register means to the output of said apparatus.

4,023,145

TIME DIVISION MULTIPLEX SIGNAL PROCESSOR

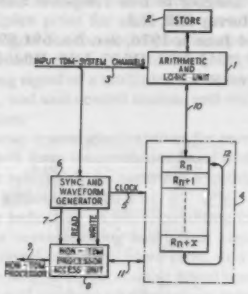
Winston Theodore Duerdoth, Colchester; Christopher Anthony Brown, Ipswich; Michael Robert Miller, Colchester, and Arthur Robin Potter, Suffolk, all of England, assignors to The Post Office, London, England

Filed Oct. 14, 1975, Ser. No. 621,802

Claims priority, application United Kingdom, Oct. 18, 1974, 45220/74

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **9 Claims**



1. A data processor for processing data carried by a plurality of time division multiplex channels which are switched into circuit in succession at a predetermined rate the processor having input means for receiving data from the time division multiplex channels, execution means connected to the input means and a register means for storing representations of a plurality of groups of program functions to be performed on data carrid by the channels, the groups being respectively allocated to the time division multiplex channels, decoding means for decoding the program function data and applying controls signals to control the execution means, said execution means being responsive to said control signals for performing the functions on the data being applied to the execution means by said input means said register means comprising a group of storage means equal in number to the number of time division multiplex channels, means for circulating the contents of each of the storage means of said register means round the group of storage means, means for synchronising the circulating means with the time division multiplex channel switching rate, and means for deriving an output from a particular one of the storage means and applying the output to control the execution means, whereby the program functions for the time division multiplex channels are produced from the register synchronously with the data carried by the channels.

4,023,146

METHOD FOR COMPUTING AND EVALUATING EMERGENCY PRIORITY AND EVACUATION ROUTES FOR HIGH RISE BUILDINGS, MINES AND THE LIKE

Wayne E. Carroll, 206 Fairway, Longwood, Fla. 32750

Filed Feb. 3, 1976, Ser. No. 654,739

Int. Cl.² G06F *3/00;* **G08B** *19/00*

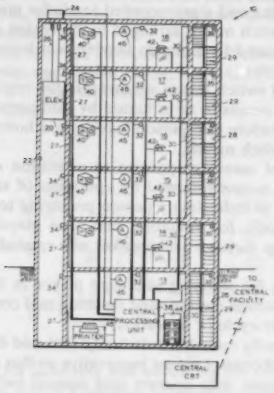
U.S. Cl. 340—172.5 **5 Claims**

1. The method for determining evacuation priority and providing an indication thereof for use in installations such as buildings, mines, ships and the like of the type having a plurality of separate areas within, said method comprising the steps of:

detecting an alarm condition in one of said areas and providing an input responsive thereto;

receiving said inputs from all of said areas and computing a priority between said inputs on a predetermined basis dependent upon the relative emergency between said alarm conditions; and

providing an indication representative of said emergency



priority to that one of said areas representing the highest emergency priority.

4,023,147

ASSOCIATIVE CAPACITIVE STORAGE CIRCUITS

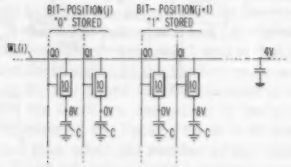
Claus Schuenemann, Schoenaich, and Frank Tsui, Holzgerlingen, both of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 6, 1975, Ser. No. 620,481

Claims priority, application Germany, Nov. 16, 1974, 2454427

Int. Cl.[2] G11C *11/02*

U.S. Cl. 340—173 CA 4 Claims



1. An associative storage circuit comprising

a word line,

a plurality of cells coupled to said word line, each of said cells comprising

a first capacitive storage circuit including a field-effect transistor having first and second current carrying electrodes and a gate electrode, and

a capacitor serially connected with said transistor at said first electrode, said second electrode being connected to said word line,

a plurality of query lines, one of said lines being connected to a respective one of each of said gate electrodes,

means for simultaneously applying an identifier word bit pulse to each of said query lines, and

means for detecting voltage changes on said word line.

4,023,148

WRITE SPEED-UP CIRCUIT FOR INTEGRATED DATA MEMORIES

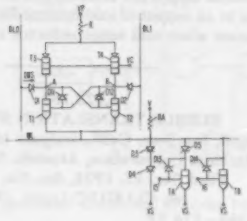
Klaus Heuber, Boeblingen; Wilfried Klein, Holzgerlingen; Knut Najmann, Gaertringen, and Siegfried K. Wiedmann, Stuttgart, all of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,538

Claims priority, application Germany, Dec. 7, 1974, 2457921

Int. Cl.[2] G11C *11/40*

U.S. Cl. 340—173 R 11 Claims



1. A memory circuit comprising,

a word line,

a bit line,

a memory cell coupled to the word line and the bit line,

a voltage selection circuit coupled to said word line comprising

first means for setting said word line at a first voltage level having a given magnitude to permit standby current to flow through the cell,

second means for setting said word line at a second voltage level having a magnitude lower than the said given magnitude to increase the current flow through the cell to discharge the internal nodes of the cell, and

third means for setting said word line at a third voltage level having a magnitude higher than said second magnitude to turn off said cross coupled cell, and

means coupled to said bit line for selectively applying a write current to said cell during the application of said third voltage level to said word line to recharge the state of one of said internal nodes.

4,023,149

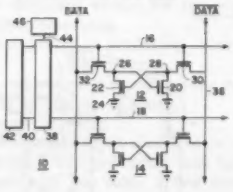
STATIC STORAGE TECHNIQUE FOR FOUR TRANSISTOR IGFET MEMORY CELL

Alan R. Bormann; William L. Martino, and Jerry D. Moench, all of Tempe, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 28, 1975, Ser. No. 626,596

Int. Cl.[2] G11C *11/40*

U.S. Cl. 340—173 R 4 Claims



1. A memory circuit comprising a four transistor IGFET memory cell including first and second cross-coupled switch IGFETs coupled to first and second gating IGFETs, respectively, and selection circuit means coupled to gate electrodes of said first and second gating IGFETs for generating an intermediate voltage maintaining said memory cell in a standby

state, and generating a second voltage level de-selecting said memory cell and generating a third voltage level on said first and second gating IGFETs during an operation of reading data from said memory cell or writing data into said memory cell wherein said selection circuitry comprises intermediate reference voltage circuit means for generating a reference voltage slightly greater than the sum of a switch IGFET threshold voltage and a gating transistor threshold voltage, and further includes a selection circuit including decoder circuitry for selecting one of a plurality of selection conductors coupled to a plurality of gating IGFETs, and electrically isolating said selection conductors from said decoder circuitry when said semiconductor chip is not selected and coupling said selection conductor to an output of said intermediate reference voltage circuit means when said semiconductor chip is unselected.

4,023,150

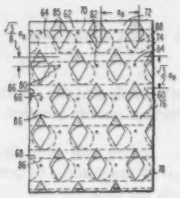
BUBBLE TRANSLATION SYSTEM

Otto Voegeli, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,518

Int. Cl.² G11C *11/14, 19/00*

U.S. Cl. 340—174 TF **11 Claims**



1. A combination suitable for the translation of a bubble lattice having a lattice constant, a_0, comprising

confining means which define a lattice translation axis and adapted to restrict bubble motion perpendicular to said axis,

a first array of parallel first conductors positioned at an angle of 60° to the lattice translation axis and connected to a first current source, and

a second array of parallel second conductors positioned in the same plane as said first array at an angle of −60° to said axis and connected to a second current source.

4,023,151

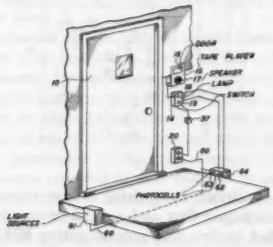
COMMUNICATION APPLIANCE OPERATING DEVICE

Lucille J. Markham, 31 Cecelia Terrace, Rochester, N.Y. 14622

Continuation-in-part of Ser. No. 569,148, April 17, 1975, abandoned. This application Nov. 24, 1975, Ser. No. 634,851

Int. Cl.² G08B *23/00*

U.S. Cl. 340—221 **6 Claims**



1. A home reminder device for reminding a person about to leave a home through a door of precautions to take before leaving, said device comprising

a. a tape player located in the region of said door and having a speaker and a prerecorded reminder message;

b. first switch means arranged in the region of said door to be actuated by a person leaving said home through said door;

c. second switch means arranged in the region of said first switch means to be actuated by said person leaving said home before said person leaving said home actuates said first switch means;

d. control means responsive to operation of said second switch means followed by operation of said first switch means as indicating a person preparing to leave through said door, for actuating said tape player to play said message through said speaker as a reminder to such person;

e. means for stopping said tape player at the end of said prerecorded message and resetting said control means for another cycle of operation;

f. a manually operable switch adjacent said door for rendering said control means inoperative so that a person within said home may operate said manual switch to prevent playing said reminder message when opening said door to admit a visitor; and

g. a signal light adjacent said manually operable switch for indicating visually the operative or inoperative state of said control means.

4,023,152

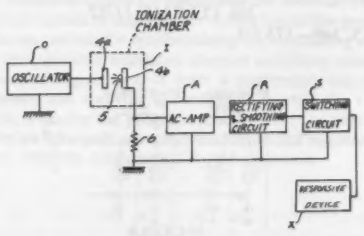
IONIZATION TYPE SMOKE SENSING DEVICE

Yoshihiko Okuda, Hirakata; Tsunehiko Araki, Ashiya, and Shigeru Matsumoto, Seto, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 402,182, Oct. 1, 1973, abandoned, which is a continuation of Ser. No. 191,636, Oct. 22, 1971, abandoned. This application Apr. 28, 1975, Ser. No. 572,315

Int. Cl.² G08B *17/10*

U.S. Cl. 340—237 S **3 Claims**

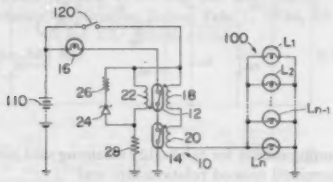


1. A smoke sensing device comprising in combination, a single ionization chamber including a pair of opposed electrodes exposed to the ambient atmosphere, a radioactive source associated with the electrodes and capable of ionizing the air between the electrodes, a load resistor coupling one of said electrodes to a reference potential, square wave oscillator means coupled to the other of said electrodes for causing a square wave ionization current to flow between said electrodes and through said load resistor, an A.C. amplifier coupled to the resistor for producing an alternating output signal proportional to said ionization current, a rectifier coupled to the amplifier for producing a direct voltage output signal which varies in accordance with the magnitude of said ionization current, and means coupled to the rectifier and responsive to said direct voltage output signal for switching to an alarm condition when said ionization current decreases due to the presence of smoke particles between the electrodes.

4,023,153
DEVICE FOR INDICATING ANY WIRE BREAKING IN PARALLEL CONNECTED PLURAL LOADS

Masahiro Adachi, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Feb. 19, 1976, Ser. No. 659,361
Claims priority, application Japan, Feb. 26, 1975, 50-22776
Int. Cl.² G08B 21/00
U.S. Cl. 340—251 16 Claims



1. A device for detecting and indicating the occurrence of any breaking of wire in a plurality of load which are in parallel connection with each other and connectable to a DC power source, the device comprising:

a circuit which comprises first and second coils magnetically isolated from one another and which is electrically connected in series with the power source and the loads;

a third coil connected across the power source and arranged to produce a third magnetic field in the reverse direction to a first magnetic field produced by said first coil when the loads are connected to the power source, said third coil being arranged such that said first and third magnetic fields give a composite field;

an electrically actuatable indicator; and

a switching circuit arranged to supply power to said indicator, said switching circuit including first and second elements of the same type which are sensitive to variations in the intensity of a magnetic field therearound, said first and second elements being arranged to lie respectively in said composite magnetic field and in a second magnetic field produced by said second coil when the loads are connected to the power source;

the constants of said first, second and third coils and the sensitivities of said first and second elements being regulated, when the total number of said loads is n, such that said first element is in a first state in regard to the completion of said switching circuit only when the loads are connected to the power source and the number of broken loads is in the range between 1 and $(K-1)$, where K is a predetermined integer between 2 and n, but in a second state when the number of the broken loads is either zero or at least K, while said second element is in said first state when the loads are connected to the power source and the number of the broken loads is at least K but in said second state when the number of the broken loads is less than K, the intensity of said composite magnetic field being close to zero when the number of broken loads is K − 1, thereby to cause said indicator to be in one of the actuated and non-actuated states only when the number of the broken loads is zero and in the other state when the number of the broken loads is at least one.

4,023,154
APPARATUS FOR DETECTING LOCATION OF METAL CABLE FAILURE

Willie George Comeaux, 8067 LaSalle, Baton Rouge, La. 70806

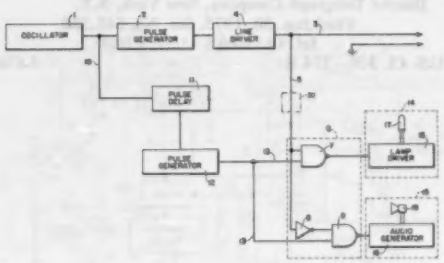
Filed Apr. 9, 1976, Ser. No. 675,516
Int. Cl.² G08B 21/00
U.S. Cl. 340—256 9 Claims

1. An apparatus for determining where a cable failure occurs which comprises:

a. an oscillator;

b. a pulse generator connected in series with said oscillator and said cable;

c. a gate assembly connected in series with said pulse generator and said cable to receive pulses which have been sent down said cable by said pulse generator and which have been reflected back toward said pulse generator;



d. a second pulse generator connected in series to said gate assembly;

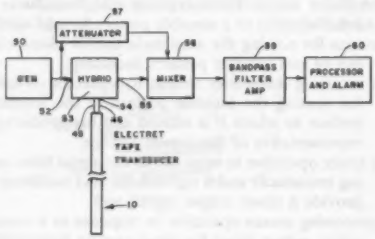
e. a pulse delay means connec'ed in series between said oscillator and said second pulse generator; and

f. a detection means connected in series with said gate assembly for detecting when said pulses being reflected and said pulses from said second pulse generator arrive simultaneously at said gate assembly.

4,023,155
ULTRASONIC TAPE INTRUSION DETECTION SYSTEM

G. Kirby Miller, Saratoga, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Dec. 23, 1975, Ser. No. 643,660
Int. Cl.² G08B 13/16; G01S 9/66; H04R 19/00
U.S. Cl. 340—258 A 6 Claims



1. An intrusion detection system for the perimeter of an area to be protected comprising

an electric signal generator producing an output at sonic frequencies,

receiver means responsive to signals having doppler shifted frequencies for producing an alarm,

transducer means comprising

at least one elongated flexible electret tape adapted to be disposed around said perimeter, said tape having an electret layer with two sides, a first conductive strip bonded tightly to one of the sides of said electret layer, and a second conductive strip disposed on the other of the sides of said electric layer for limited movement toward and away from the electret layer whereby to produce and to receive sonic wave energy, and

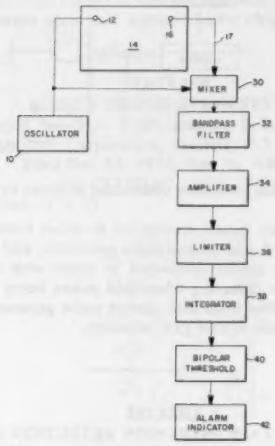
means for electrically connecting said transducer means to said generator and to said receiver means whereby sonic waves are produced by said transducer and when re-

flected by a moving object back to said transducer produce an electrical input to said receiver.

4,023,156
ALARM SYSTEM FOR DETECTING DISTURBANCE OF A SOLID MEDIUM

Aaron A. Galvin, Lexington, Mass., assignor to American District Telegraph Company, New York, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,388
Int. Cl.² G08B *13/22, 13/08*
U.S. Cl. 340—274 R 5 Claims



2. An alarm for use with an acoustically propagative medium comprising:

a transmitting transducer affixed to a surface of said medium;

oscillator means for energizing said transducer to cause establishment of a sensible pattern in said medium;

means for sensing the amplitude and/or phase characteristics of said sensible pattern, including:

a receiving transducer affixed to a surface of said medium for sensing the sensible pattern at the location on the surface to which it is affixed and for producing a signal representative of the sensed pattern;

a mixer operative in response to the signal from said receiving transducer and a signal from said oscillator means to provide a mixer output signal; and

processing means operative in response to a change in said mixer output signal for producing an intermediate signal representative of the magnitude of such change;

means for establishing a reference threshold representing a non-alarm condition; and

means for providing an output signal representative of an alarm condition upon exceedance by said intermediate signal of said reference threshold.

4,023,157
THEFT ALARM FOR PORTABLE ARTICLES

Albert J. Miller, Santa Clara, Calif., assignor to Engineering Systems Corporation, Santa Clara, Calif.

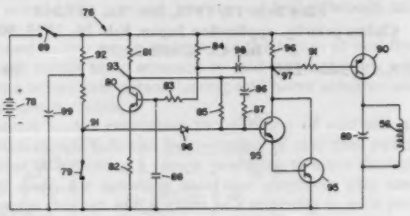
Continuation-in-part of Ser. No. 604,882, Aug. 14, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,060
Int. Cl.² G08B *13/14*
U.S. Cl. 340—280 15 Claims

1. A theft preventing alarm device for a valuable article, comprising:

motion sensing means for sensing movement of said valuable article and generating an alarm actuating signal in response to said movement,

alarm means, connected to said motion sensing means, for generating an alarm signal upon receiving said alarm actuating signal,

a pair of pivotable clamping jaws variably spaced apart to secure said device to said valuable article,



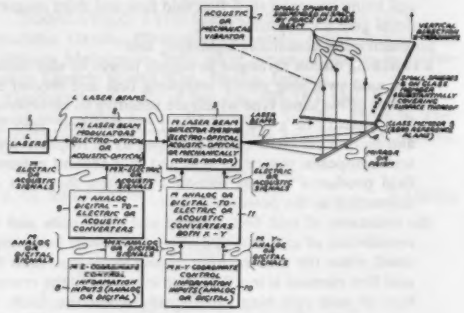
retaining means for releasably retaining said jaws in a predetermined spaced relationship, and

lock means for both arming said alarm means and actuating said retaining means.

4,023,158
REAL THREE-DIMENSION VISUAL DISPLAY ARRANGEMENT

Donald G. Corcoran, Montvale, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Continuation-in-part of Ser. No. 406,754, Oct. 15, 1973. This application July 28, 1975, Ser. No. 599,807
Int. Cl.² G06K *15/18*
U.S. Cl. 340—324 R 28 Claims


ACOUSTIC OR MECHANICAL VIBRATION
7
L LASER BEAMS
L LASERS
M LASER BEAM MODULATORS ELECTRO-OPTICAL OR ACOUSTIC-OPTICAL
M LASER BEAM DEFLECTOR SYSTEMS ELECTRO-OPTICAL ACOUSTIC-OPTICAL OR MECHANICALLY MOVED MIRRORS
LASER BEAMS
M ELECTRIC OR ACOUSTIC SIGNALS
M ANALOG DIGITAL — TO — ELECTRIC OR ACOUSTIC CONVERTERS
9
M ANALOG OR DIGITAL — TO — ELECTRIC OR ACOUSTIC CONVERTERS BOTH X — Y
11
M ANALOG OR DIGITAL SIGNALS
M ANALOG OR DIGITAL SIGNALS
M Z-COORDINATE CONTROL INFORMATION INPUTS (ANALOG OR DIGITAL)
8
M X-Y COORDINATE CONTROL INFORMATION INPUTS (ANALOG OR DIGITAL)
10

1. A real three-dimensional visual display arrangement comprising:

L lasers to produce L laser beams, where L is an integer greater than one;

M first source of Z-coordinate information to be displayed, where M is an integer equal to L;

M second sources of X and Y-coordinate information to be displayed;

M first means each coupled to a different one of said first sources and in an operative relation with a different one of said laser beams at the output of said lasers to intensity modulate each of said laser beams in accordance with an associated one of said Z-coordinate information;

M second means each coupled to a different one of said second sources and in an operative relation with a different one of said laser beams at the output of said first means to deflect each of said laser beams in accordance with an associated one of said X and Y-coordinate information;

a third means transparent to said laser beams in the path of said laser beams at the output of said second means; and

a plurality of small particles supported by said third means prior to said laser beams at the output of said second means passing through said third means, certain ones of said plurality of small particles being raised from said third means by said laser beams at the output of said

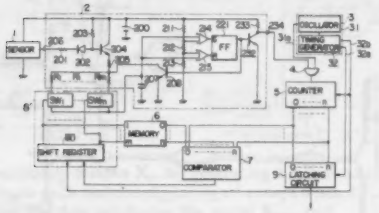
second means and suspended and held in space above said third means by said laser beams at the output of said second means to provide a real three-dimensional display of said X, Y and Z-coordinate information.

4,023,159

NON-LINEAR ANALOGUE-DIGITAL CONVERTER

Nobuaki Miyakawa, Hitachi, and Masayuki Miki, Katsuta, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 28, 1975, Ser. No. 544,758
Claims priority, application Japan, Feb. 1, 1974, 49-12783
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **6 Claims**



1. A non-linear analogue-to-digital converter having a variable conversion performance, comprising;

a control pulse generator circuit for producing gate pulses of a predetermined duration and a reset pulse signal when said gate pulse signal is at logical level "O",

a function generator having a plurality of analogue-to-digital conversion characteristics each corresponding to associated resistors provided discretely,

an AND gate applied at input thereof with a signal from said function generator and said gate pulse signal from said control pulse generator circuit,

a counter circuit for counting signal from said AND gate and adapted to be reset by said reset pulse signal from said control pulse generator,

a storing means in which patterns for determining said analogue-to-digital conversion performance is previously stored,

a comparator circuit for comparing the stored content of said storing means with the count value of said counter circuit to produce a shift pulse when said count value exceeds said stored content, and

a switching means for sequentially changing-over resistors provided for determining said analogue-to-digital conversion characteristic of said function generator in response to said shift pulse signal from said comparator circuit.

4,023,160

ANALOG TO DIGITAL CONVERTER

Barry Alex Kirschner, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 622,867
Int. Cl.² H03K *13/20*
U.S. Cl. 340—347 NT **18 Claims**

1. An analog to digital converter comprising:

a node,

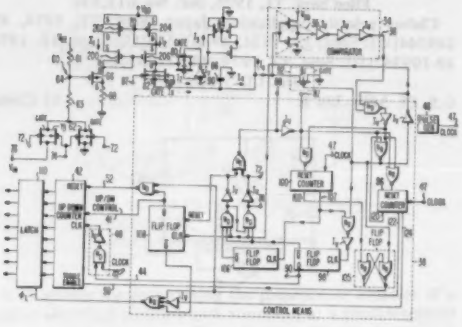
first means for selectively applying a first reference current in a first sense to said node,

second means for selectively applying a second reference current in a second sense to said node,

third means for selectively applying a third current in said first stage to said node, said third current being proportional to a signal having a value to be determined,

charge storage means coupled to said node,

circuit means including comparator and counting means responsive to the value of the charge stored in said storage means for applying said first, second and third currents to said node in a predetermined sequence so that said storage means is: first, charged for a first time interval from an initial given reference charge value by said first current; second, discharged to said given reference charge value in a second time interval by said second current; third, charged from said reference charge value in a time interval whose duration is the same as said first time interval by said third current; and fourth, discharged



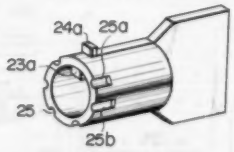
to said given reference charge value by said second current in a third time interval, the value of said third time interval with respect to the value of said second time interval manifesting said value to be determined, said circuit means comparing said third and second time intervals to produce a digital signal representing said value to be determined.

4,023,161

KEY DEVICE FOR PRODUCING BINARY CODES

Makoto Sasaki, 1700-18, Bukko-cho, Hodogaya, Yokohama, Japan

Filed June 3, 1976, Ser. No. 692,562
Claims priority, application Japan, June 3, 1975, 50-66802; Oct. 4, 1975, 50-135778[U]
Int. Cl.² G08C *1/00;* H01H *27/00*
U.S. Cl. 340—365 R **3 Claims**



1. A binary code-generating key device which comprises an outer casing defined by a dividing plane perpendicular to the axis of said casing into a first section provided with a penetrating hole of smaller inner diameter and a second section bored with a penetrating hole of larger inner diameter; an output shaft whose shoulder portion extends along the dividing plane and which can slide through said penetrating holes; a plurality of switch means fixed to the outer casing concentrically with the output shaft; a plurality of push pin assemblies provided in a number corresponding the plurality switch means and each formed of at least linearly arranged first, second and third unit pins, said push pin assembly slidably penetrating the shoulder portion of the output shaft parallel with the axis of said output shaft with part of said assembly slidably inserted into the first section of the outer casing thereby normally to lock the output shaft to the outer casing, and, when pushed, unlocking the output shaft for selective operation of the plural switch means; a plurality of keys each being capable of transmitting the rotation of the key to the output shaft and provided with a plurality of longer and shorter grooves, pushing part of the push pin assembly into the first section of the outer casing, and

unlocking the output shaft for selective operation of the plural switch means; and means for generating a binary code exclusively represented by each key when the output shaft is rotated through a prescribed angle.

4,023,162
ELECTRONIC BUZZER

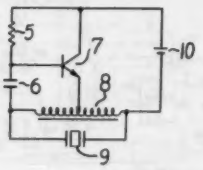
Fumikazu Murakami, Chiba, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sept. 11, 1975, Ser. No. 612,538

Claims priority, application Japan, Sept. 11, 1974, 49-109344[U]; Sept. 11, 1974, 49-109345[U]; Sept. 11, 1974, 49-109352[U]; Sept. 17, 1974, 49-112253[U]

Int. Cl.² G08B *3/10*

U.S. Cl. 340—384 E **11 Claims**



1. An electronic buzzer comprising: an acoustic vibrator comprised of a vibratable metal plate, means fixedly supporting said metal plate around its periphery to undergo vibration relative to its fixed periphery, and a piezoelectric element adhered to one face of said metal plate; and driving means for applying electric driving signals to said acoustic vibrator to vibrationally drive the same at a 1/N multiple of its natural frequency, where N is an integer, to thereby cause said acoustic vibrator to emit an audible buzzing sound.

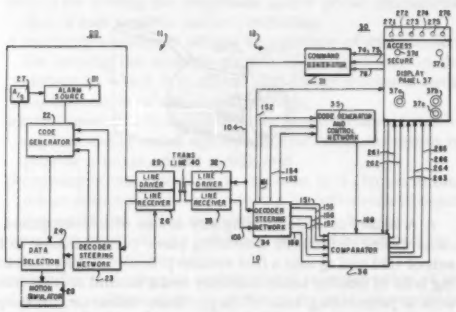
4,023,163
HIGH SECURITY ALARM TRANSMISSION SYSTEM

Ramesh Krishnaiyer, Halls Corners; John C. Donovan, Whitefish Bay, and Frank J. Esser, Waukesha, all of Wis., assignors to Johnson Controls, Inc., Milwaukee, Wis.

Filed Sept. 19, 1975, Ser. No. 615,180

Int. Cl.² G08B *29/00*

U.S. Cl. 340—409 **43 Claims**



1. In a security system including a transmission line for permitting the transmission of information between a secured area and a monitoring area, monitoring means at said secured area including code means operable to continuously provide a line security code comprised of a sequence of code bits, data means for providing at least one data bit representing information to be transmitted to said monitoring area, and select means for receiving the bits of said line security code and said data bit, and means for controlling said select means to provide a modified line security code, including selected code bits of said line security code and said data bit, which is continuously transmitted over said transmission line to said monitoring area, and receiver means at said monitoring area including means for receiving said modified line security code, first means responsive to said selected code bits of the line security code to provide a first output indicative of the security of the transmission line, and second means responsive to said data bit to provide a second output representing said information.

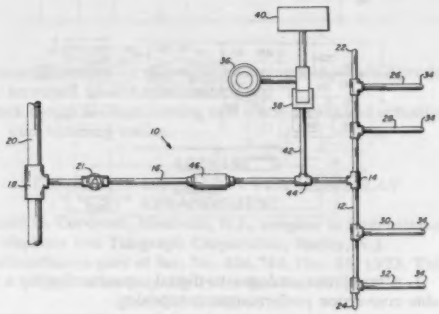
4,023,164
HEAT DETECTION AND ALARM SYSTEM

Larry R. Delaney, Cheswick, Pa., assignor to Bituminous Coal Research, Inc., Monroeville, Pa.

Filed Dec. 29, 1975, Ser. No. 644,948

Int. Cl.² G05D *23/12*; G08B *17/04*

U.S. Cl. 340—418 **7 Claims**



1. Heat detection and alarm apparatus comprising,

a pressurized source of fire retardant liquid,

a heat sensitive conduit for transporting said fire retardant liquid and having sealed end portions such that said conduit is operable to rupture when the temperature thereof exceeds a preselected level,

said heat sensitive conduit positioned adjacent a source of heat such that an increase in temperature thereof above a preselected level is operable to rupture said heat sensitive conduit and thereby discharge said fire retardant liquid upon the source of heat to reduce the temperature to a safe predetermined level,

conduit means for connecting said heat sensitive conduit with said pressurized source of fire retardant liquid to maintain a selected liquid pressure in said heat sensitive conduit,

alarm means responsive to a decrease in the liquid pressure within said conduit means for transmitting a signal to indicate rupture of said heat sensitive conduit,

pressure responsive means connected to said conduit means for maintaining said alarm means in a deactivated condition, and

said pressure responsive means operable upon rupture of said heat sensitive conduit and a subsequent reduction of the liquid pressure in said conduit means to actuate said alarm means and indicate the presence of an elevated temperature.

4,023,165
SIGNAL MODIFICATION TECHNIQUES

Robert Alan Holt, Alhambra, and Kenneth Charles Adam, Thousand Oaks, both of Calif., assignors to RCA Corporation, New York, N.Y.

Filed June 2, 1975, Ser. No. 583,186

Int. Cl.² G01S *9/60*; G06F *3/14*

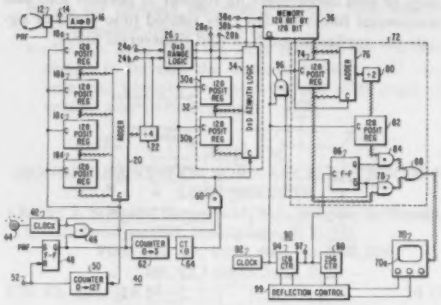
U.S. Cl. 343—5 W **7 Claims**

1. In a display device for displaying a desired pattern in the form of a two-dimensional spot matrix, each spot having any one of a given plurality in excess of two of visually different characteristics comprising, in combination:

means producing serial multibit digital signals, the values of

which represent the characteristics of the spots in said pattern, said signals including noise such that random ones of said signals have undesired values;

means comparing each multibit digital signal, X_t, with a signal X_{t-1} representing the spot which immediately preceeds, and a signal X_{t+1} representing the spot which im-



mediately follows X_t, for producing a signal corresponding to each multibit digital signal except when $X_{t-1} = X_{t+1}$, and for then producing the signal X_{t+1}; and

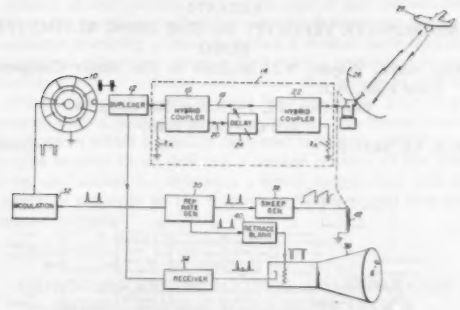
display means responsive to signals from said comparing means for displaying said spot matrix whereby the display exhibits a more visually pleasing pattern than if said comparing apparatus were not operative.

4,023,166

HIGH POWER LOW LOSS NONRESONANT FILTER SYSTEM

Richard M. Marshall, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed June 23, 1975, Ser. No. 589,229
Int. Cl.² G01S 9/02; H03B 1/04
U.S. Cl. 343—5 R **20 Claims**



11. The method of filtering oscillations from a source within a predetermined frequency spectrum comprising the steps of:

coupling said oscillations from said source to a plurality of channels with a first hybrid coupler; and

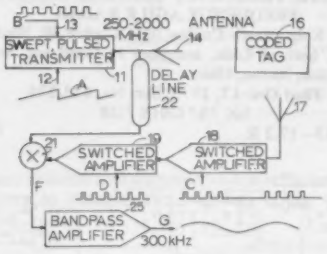
coupling said channels to a load with a second hybrid coupler, with the transit times of said channels betweed said hybrid couplers being different from each other, thereby directing the portion of said oscillations within a predetermined region of said spectrum to said load and absorbing the portion of said oscillations outside of said region of said spectrum.

4,023,167

RADIO FREQUENCY DETECTION SYSTEM AND METHOD FOR PASSIVE RESONANCE CIRCUITS

Sven E. Wahlstrom, 570 Jackson Drive, Palo Alto, Calif. 94303

Filed June 16, 1975, Ser. No. 586,891
Int. Cl.² G01S 9/56
U.S. Cl. 343—6.5 SS **16 Claims**



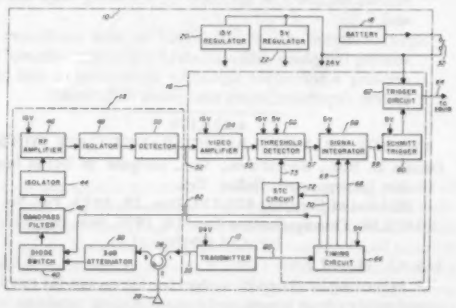
1. A system for determining the presence or absence of a passive electrical circuit which resonates at a predetermined frequency including means for radiating said electrical circuit with periodic bursts of radio frequency energy of predetermined duration having energy at said resonant frequency at a predetermined burst rate to thereby excite the electrical circuit if it is present whereby it radiates energy at said frequency, means for receiving and periodically amplifying at a rate which differs from the burst rate energy at said frequency after termination of said bursts and generating an output signal, and means connected to said receiving means to receive said output signal and provide a signal indicative of the presence or absence of a passive circuit resonant at said frequency.

4,023,168

RADAR ALTIMETER

Joseph A. Bruder, Snyder, and Marcus Staloff, Williamsville, both of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed July 11, 1975, Ser. No. 595,264
Int. Cl.² G01S 9/06
U.S. Cl. 343—7 ED **6 Claims**



1. Radar altimeter means including:

A. transmitter means for generating radio frequency pulses;

B. antenna means for transmitting said radio frequency pulses and for receiving terrain echo signals;

C. tuned radio frequency receiver means for sensing said received terrain echo signals and for converting said received terrain echo signals to video signals wherein said tuned radio frequency receiver means includes and the received terrain echo signals are sequentially acted upon by;

1. diode switch means;

2. bandpass filter means;
3. radio frequency amplifier means;
4. detector means;

D. video processing and timing circuit means for amplifying said video signals and for producing a signal; and

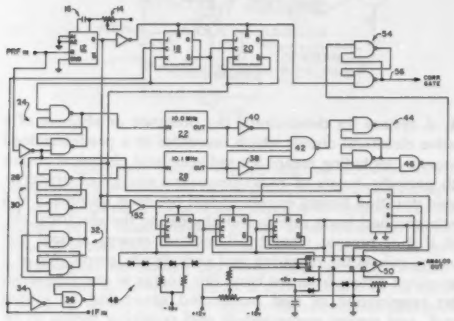
E. power source means for powering said radar altimeter means.

4,023,169

AUTOMATIC FREQUENCY CONTROL CIRCUIT FOR FREQUENCY AGILE RADAR

Edward J. Kolp, North Canton, and Girden W. Harrington, Penisula, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 17, 1975, Ser. No. 623,224
Int. Cl.² G01S 7/28
U.S. Cl. 343—17.2 R **7 Claims**



1. A fine correction automatic frequency control circuit for frequency agile radar system, comprising:

pulse generator means connected to said radar system, receiving an IF envelope therefrom, and producing an output pulse of time duration equivalent to a fixed number of periods of the IF;

first and second oscillators of different fixed frequencies connected to and controlled by said pulse generator means, said first oscillator being of a less frequency than said second oscillator and said first oscillator being actuated by a leading edge of said output pulse while said second oscillator is actuated by a trailing edge thereof; and

error detection means connected to said oscillators for sensing the phase differentials of the outputs thereof and creating a correction signal for application to said radar system dependent upon said phase differential.

4,023,170

CHARGE TRANSFER DEVICE RANGE GATE FILTER

Dennis D. Buss, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 429,229, Dec. 28, 1973, Pat. No. 3,942,034. This application Oct. 14, 1975, Ser. No. 621,972
Int. Cl.² G01S 9/42
U.S. Cl. 343—7.7 **3 Claims**

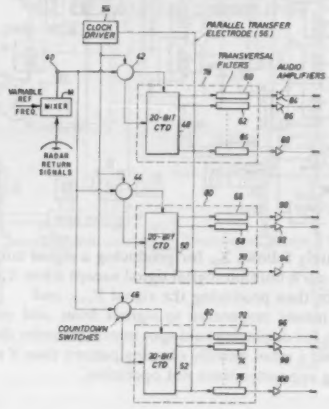
1. In moving target radar system having means for receiving signal returns from targets and a signal mixing means to which said signal returns are applied together with a reference frequency to produce an input signal having a frequency corresponding to the difference between the frequencies of said return and reference signals: a charge transfer device for frequency filtering each of a plurality of time segments of said input signal, comprising

a demultiplexing charge transfer device shift register having a plurality of serial sites for receiving and storing signals corresponding to respective time segments of said input signal,

clocking means connected to apply clocking pulses to said shift register for loading data into said shift register in serial fashion at a preselected rate so that each of said sites sequentially includes a signal for a separate time segment,

a plurality of charge transfer device transversal frequency filters connected to said respective sites of said demultiplexing shift register and to said clocking means,

said clocking means transferring stored signals from said sites of said demultiplexing register in parallel into said transversal filters so that only related time segment signals are applied to each of said transversal filters,



each of said filters having a narrow pass band for isolating a desired signal frequency range in a time segment assigned thereto, said pass band having a center frequency determined by the frequency of said clocking means pulses applied to said shift register, and

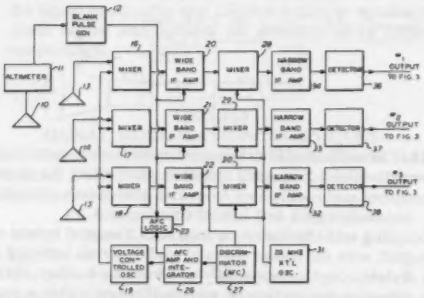
signal amplifier means connected to each said transversal filter to obtain from said filter signals within the filter pass band in the signal time segment assigned to that said transversal filter.

4,023,171

MICROWAVE VELOCITY SENSOR USING ALTIMETER ECHO

Gus Stavis, Wayne, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed Nov. 12, 1975, Ser. No. 631,024
Int. Cl.² G01S 9/48
U.S. Cl. 343—8 **10 Claims**



1. A velocity sensor system comprising:

a source of narrow pulse radio signals,

a plurality of receiving antennas spaced from each other for

the reception of said signals backscattered from the ground,

means for combining received radio signals with a first internally generated signal and producing thereby a first intermediate frequency,

means for combining said first intermediate frequency with a second internally generated signal and thereby providing a second intermediate frequency,

means for deriving intelligence signals from said second intermediate frequency, and

means for measuring the time required for the received signals to traverse the distance between said receiving antennas whereby the velocity and drift angle of said vehicle may be determined.

4,023,172

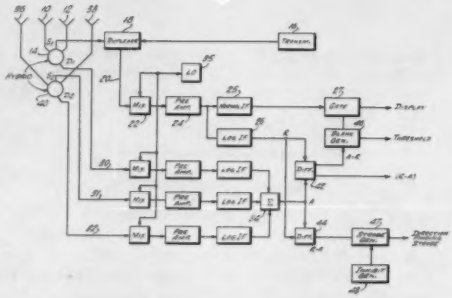
MONOPULSE SYSTEM FOR CANCELLATION OF SIDE LOBE EFFECTS

Charles J. Schmidt, Bergenfield, N.J., assignor to Numax Electronics Incorporated, Hauppauge, N.Y.

Filed Dec. 17, 1959, Ser. No. 860,289

Int. Cl.² G01S *3/32, 9/22*

U.S. Cl. 343—16 M **14 Claims**



1. A radio receiving system comprising a directional antenna having a boresight axis and a pair of main antenna feed horns equally spaced from and normal to said axis, with an auxiliary pair of similar antenna feed horns disposed in alignment with the main pair and spaced farther from said axis, a multiple channel receiver, first feed means connecting a first channel of said receiver to the main pair of said antenna feed horns for providing a first output said first output having a radiation receiving pattern including a desired main lobe and undesired side lobes, second feed means connected to said auxiliary pair of antenna feed horns, and means in said receiver connected to said second feed means for providing a second output, said second output having a directional receiving pattern which is greater than said radiation pattern at all angles beyond those defining a central portion of the main lobe, and means for obtaining a signal output from said receiver in response to the difference between said first and second outputs.

4,023,173

OBJECT DISCERNING METHOD AND APPARATUS USING A SPATIAL WAVE PROPAGATION

Takehiko Hidaka, Tokyo, Japan, assignor to Agency of Industrial Science & Technology, Tokyo, Japan

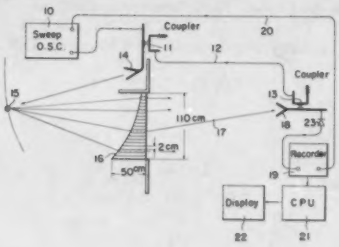
Filed Sept. 11, 1975, Ser. No. 612,493

Claims priority, application Japan, Sept. 12, 1974, 49-104324

Int. Cl.² G01S *7/04, 7/56*

U.S. Cl. 343—17 **13 Claims**

1. An object discerning apparatus comprising: a stationary source for generating a wave at variable frequency; an asymmetric, dispersive medium to cause an object-scattered wave to refract in passing through the medium; a stationary detector to receive the scattered and refracted wave and means at the detector to cause the received wave to interfere with a reference wave whereby in the course of wave propagation to said



stationary detector said scattered wave is refracted to a different degree by changing the frequency of the wave before detection.

4,023,174

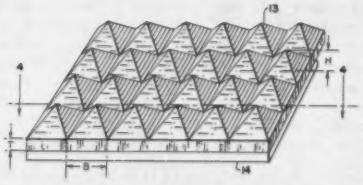
MAGNETIC CERAMIC ABSORBER

Rufus W. Wright, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 720,513, March 10, 1958, abandoned. This application Oct. 19, 1960, Ser. No. 63,699

Int. Cl.² H01Q *17/00*

U.S. Cl. 343—18 A **2 Claims**



1. A broadband microwave absorber comprising a sheet of magnetic ceramic material having the general formula, $MOFe_2O_3$, in which Fe_2O_3 is present in an amount in the range of between about 65 and 80 percent by weight of said material and in which MO represents bivalent metal oxides containing at least nickel oxide and zinc oxide, said nickel oxide being present in an amount of between about 3 and 12 percent by weight and said zinc oxide being present in an amount of between about 15 and 25 percent by weight, and including bivalent metal oxides selected from the group consisting of manganese oxide, calcium oxide and magnesium oxide, said manganese oxide being present in an amount of between about 0 and 10 percent by weight, said calcium oxide being present in an amount of between about 0 and 2 percent by weight and said magnesium oxide being present in an amount of between about 0 and 2 percent by weight, said sheet having a thickness which is substantially an electrical quarter wavelength at the lower range of microwave frequencies.

4,023,175
IMAGING SYSTEMS

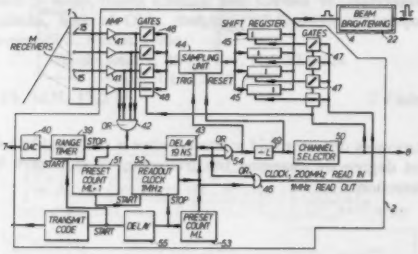
Robin Charles Armstrong Brown, Odos Ieroloxiton 6, Aghia Paraskevi, Attikis, Greece, and Julian Dow, 8 Avenue du Lignon, Le Lignon, 1211 Geneve, Switzerland

Filed Oct. 22, 1975, Ser. No. 624,931

Claims priority, application United Kingdom, Oct. 24, 1974, 46129/74

Int. Cl.² G01S 7/04

U.S. Cl. 343—17 **24 Claims**



1. An imaging control arrangement for use with a transmission-reception means for transmitting pulses, which means has an array of receivers for receiving transmitted pulses after reflection and with imaging means for displaying in an image plane an image representing an object surface, the imaging control arrangement having:

an input arrangement for receiving from the transmission-reception means echo signals conveying echo data relating to the distance away of reflective elements;

an output arrangement for connection to the imaging means to feed control signals thereto;

and, connected between the input and output arrangements, signal processing means for receiving the echo data and for defining therefrom, and from range information relating to the range of the object surface to be imaged, equitime loci in the object surface corresponding to the echo data, the equitime loci being the loci of all those object elements in the object plane which would give the same pulse transmission time from the transmitter to the object plane and back to the receiver, the signal processing means being operable to produce from these defined equitime loci said control signals for the imaging means such as to cause the display in the image plane of a plurality of image elements representing reflective elements substantially in the object surface by displaying image elements at positions corresponding to intersections of these equitime loci.

4,023,176
BEACON TRACKING DISPLAY SYSTEM

Harry A. Currie, Farmers Branch, and William F. Heathcock, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 2, 1975, Ser. No. 564,401

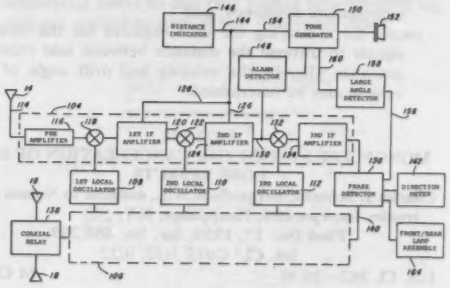
Int. Cl.² G01S 5/02

U.S. Cl. 343—113 R **5 Claims**

1. In a beacon tracking system of the class wherein a transmitter transmits RF energy at a preselected frequency to a mobile receiver having a plurality of omnidirectional antennae positioned along the lateral and longitudinal axis of the mobile receiver for selectively connecting to a plurality of triple conversion channels including automatic gain control circuitry and a phase detector, the combination with said mobile receiver of a display panel means comprising a case adapted for mounting on the dash of the mobile receiver, said case having:

a. a first front panel needle deflection type meter responsive to signals received by selected left/right and front/rear omnidirectional antennae circuits for providing selectively a visual indication whether the transmitter is either left or right of the mobile receiver or front or rear of the mobile receiver;

b. a front/rear selector switch for disconnecting the right-/left antenna circuit and connecting the front rear antenna circuit to the first front panel meter; and



c. a second front panel, needle deflection type meter for indicating the distance to the transmitter responsively to the amplitude of the signals received by the selected antenna.

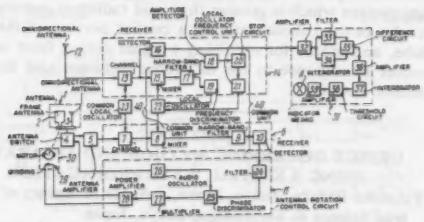
4,023,177
AUTOMATIC RADIO COMPASS

Aron Borukhovich Bukhman, Khersonskaya ulitsa, 18, kv. 90; Igor Lvovich Yanushkevich, Angarskaya ulitsa, 49, korpus 2, kv. 93; Vadim Dmitrievich Kalashnikov, Leninsky prospekt, 85, korpus 6, kv. 65; Marina Isaakovna Levitina, 5 Monetchikovsky pereulok, 13, kv. 80; Jury Borisovich Rozenberg, Kirovogradskaya ulitsa, 10, korpus 2, kv. 165, all of Moscow; Vladimir Valentinovich Elkin, ulitsa semii, Shamshinykh, 37a, kv. 7, Novosibirsk, and Elena Mikhailovna Ponomareva, Pyatnitskaya ulitsa 2, kv. 27, Moscow, all of U.S.S.R.

Continuation of Ser. No. 445,154, Feb. 20, 1974, abandoned. This application Dec. 26, 1974, Ser. No. 536,445

Int. Cl.² G01S 5/02

U.S. Cl. 343—117 R **3 Claims**



1. An automatic radio compass comprising: a first directional antenna, the radiation pattern whereof being reversible through 180° and having two equisignal reception directions in the process of the changeover, said first antenna being intended for the reception and amplitude with a low-frequency switching signal of the signal whose bearings are being

taken and which is a high-frequency signal modulated with an audio-frequency signal, the depth of said amplitude modulation being dependent on the angle between said equisignal reception direction and the bearing to the source of the signal whose bearings are being taken; a second antenna, the effective length whereof is at least 25 times as great as that of said first atenna; a first receiver; said first receiver having a channel wherein said signal whose bearings are being taken is shaped and amplified, the input of said channel being electrically connected to said first antenna; a second receiver; said second receiver having a channel in which said signal whose bearings are being taken is shaped and amplified, the input of said channel being electrically connected to said second antenna; a detector of said first receiver, producing said modulating signals; a detector of said second receiver, producing said modulating audio-frequency signal; a circuit controlling the rotation of said first antenna, which circuit produces a control signal corresponding to the amplitude and phase of said modulating low-frequency switching signal and is intended to control the rotation of said first antenna by turning it until said equisignal reception direction coincides with the bearing to said source of the signal whose bearings are being taken, the input of said circuit being electrically connected to the output of said detector of said first receiver; an indicator means, the input whereof is connected to the output of said second receiver; and a unit connected to both said first and second receivers, ensuring their noise immunity wherein said unit is capable of ensuring the required noise immunity in the case when said signal whose bearings are being taken in a continuous modulated high frequency signal, the duration of radiation whereof is at least equal to the time of response of said first antenna rotation control circuit, which unit comprises: a controlled local oscillator having two control inputs and two outputs; a first mixer, the first input whereof is connected to the output of said channel of the second receiver and the second input is connected to said first input of said controlled local oscillator; a second mixer, the first input whereof is connected to the output of said channel of the first receiver and the second input is connected to said second output of said controlled local oscillator; a first narrow-band filter with an input and two outputs, having a resonant frequency and a pass-band which is at least twice as high as the frequency of said modulating low-frequency signal, the input of said first narrow-band filter being connected to the output of said first mixer; a second narrow-band filter having a resonant frequency and a pass-band which is at least twice as high as the frequency of said modulating low-frequency signal, the input of said second narrow-band filter being connected to the output of said second mixer and the output thereof being connected to the input of said detector of the first receiver; an amplitude detector converting the signal from the output of said first narrow-band filter into a d-c voltage, the input of said detector being connected to the first output of said first narrow-band filter; a frequency discriminator tuned to the resonant frequency of the first filter and converting the difference between the frequency of the signal from the output of said first filter and the resonant frequency of said first filter into a d-c voltage, the input of said frequency discriminator being connected to the second output of said first narrow-band filter and the output being connected to said first control input of said controlled local oscillator; a local oscillator frequency control unit varying said frequency stepwise within preset limits the output of said unit being connected to said second control input of said controlled local oscillator; and a circuit stopping said local oscillator frequency control unit, the input of said circuit being connected to the output of said amplitude detector and the output being connected to the input of said local oscillator frequency control unit, said circuit fixing the voltage at the output of said local oscillator frequency control unit at the moment of arrival of a signal from the output of said amplitude detector.

4,023,178

RADIO-CONTROLLED VEHICLE WITH RF NOISE ELIMINATION FEATURE AND WITH ULTRASONIC ANTI-COLLISION MEANS INSENSITIVE TO MECHANICAL SHOCKS

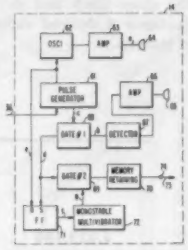
Hisao Suyama, Gunma, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi and Tokyo Sanyo Electric Co., Ltd., Gunma, both of, Japan

Filed July 23, 1975, Ser. No. 598,469

Claims priority, application Japan, July 24, 1974, 49-85470; July 26, 1974, 49-86920

Int. Cl.² H04B *7/00*

U.S. Cl. 343—225 **3 Claims**



1. A radio-controlled vehicle having a radio frequency receiver for receiving a radio frequency signal transmitted from a transmitter positioned remote from the receiver to control an electric steering motor and a drive motor carried on the vehicle, characterized in that said receiver comprises: a non-directional and a directional antenna, a mixer for mixing signals received by said non-directional antenna and said directional antenna, respectively, said antennae being carried on said vehicle, a detection circuit having an output terminal connected to an output of said mixer, an integrator circuit having an input terminal connected to an output of said detection circuit, at least a pair of flip-flop circuits having input terminals coupled to an output of said integrator circuit, whereby a direction control signal from said integrator circuit is applied to said flip-flop circuits, and means for supplying an output signal of said flip-flop circuits to said steering motor to control the same.

4,023,179

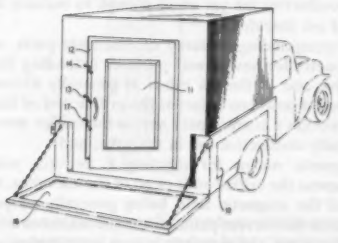
CAMOUFLAGE VHF ANTENNA

Kurt Ikrath, Elberon; William Kennebeck, Sea Bright, both of N.J., and Edward C. Shaffer, Augusta, Ga., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 8, 1975, Ser. No. 620,687

Int. Cl.² H01G *13/10*

U.S. Cl. 343—713 **4 Claims**



1. In a vehicle, or the like, having at least one cavity the dimensions of which are comparable to the half-wavelength of

the frequency of interest, a camouflaged VHF antenna which is formed by the slot created by the partial opening of a door or hatch into said cavity, said antenna further including

means for coupling radio frequency energy into said slot comprising

a source of radio frequency energy; and

co-axial cable means connecting said r.f. source to adjacent center points on the vertical door jamb and vertical door edge forming said slot;

at least one means for tuning said slot comprising

at least the series combination of a lumped variable capacitor and an inductor; and

co-axial cable means connecting said series combination with adjacent points separated from said adjacent center points on the door jamb and door forming said slot thereby to achieve a desired radiation pattern at the frequency of interest.

4,023,180

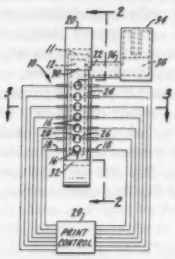
DOT PRINTER WITH ELECTRICALLY PROPELLED INK

Walter J. Zenner, 10801 Highway E, Rte. 3, Mukwonago, Wis. 53149

Filed Jan. 12, 1976, Ser. No. 648,251

Int. Cl.[2] G01D *15/18*

U.S. Cl. 346—75 10 Claims



1. A print head, for a column-sequential or row-sequential dot matrix printer which prints dots by electrically propelling droplets of electrically conductive ink onto a record, comprising:

a manifold defining an ink chamber;

a plurality of closely spaced generally parallel ink tubes having their inner ends in communication with the ink chamber and their outer ends terminating in a linear array of ink orifices, each ink tube having a diameter large enough so that the tube may be filled with electrically conductive ink yet small enough to restrain the free flow of ink therefrom;

a corresponding plurality of electrode pairs, each pair of electrodes having end portions extending into a respective one of the ink tubes at generally diametrically opposed positions adjacent the orifice end of the ink tube to provide a current path across the orifice through electrically conductive ink in the tube; and

magnetic means for creating a uniform magnetic field across the orifice ends of all of the ink tubes, the direction of the magnetic field being generally perpendicular to both the current paths across the ink tubes and the axes of the tubes, the magnetic means constituting a single magnet having its opposite poles located immediately adjacent the orifice array in positions such that the magnetic field of the one magnet extends through all of the orifices.

4,023,181

RECORDING MEDIUM CONDUCTIVE ELECTRODE

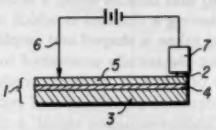
Akira Yoshikawa, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Aug. 1, 1975, Ser. No. 601,197

Claims priority, application Japan, Aug. 2, 1974, 49-91720[U]

Int. Cl.[2] G01D *15/34*

U.S. Cl. 346—165 8 Claims



1. A recording medium comprising a base body of insulating material, an electrically conductive layer disposed on said base body, a recording layer disposed on said electrically conductive layer and an electrode means non-removably, fixedly disposed on only a portion of said recording layer, said electrode means uniformly contacting said recording layer over a planar area so that the current density between the electrically conductive layer and the surface recording layer is low thereby preventing damage of said last two-mentioned layers due to the generation of heat.

4,023,182

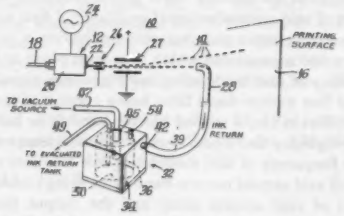
VACUUM RETURN SYSTEM FOR INK JET PRINTING APPARATUS

George W. Arway, River Grove, and Frank Eremity, Hanover Park, both of Ill., assignors to A. B. Dick Company, Chicago, Ill.

Filed Aug. 22, 1975, Ser. No. 606,944

Int. Cl.[2] G01D *15/18*

U.S. Cl. 346—75 10 Claims



1. In an ink jet printing apparatus including an assembly for projecting ink droplets toward a printing surface and catcher means for receiving ink droplets not used in printing on the surface, a vacuum return ink system for removing ink from said catcher and storing such ink in an evacuated ink return tank, said vacuum return ink system including in combination:

a vacuum source and ink/air separator means interposed between said catcher means and said ink return tank for receiving unused ink and air from said ink catcher at a first flow rate, separating the ink and air and passing said unused ink to said evacuated ink return tank at a second, slower flow rate so as to minimize ink buildup at said catcher means and the evaporation of solvent from said ink, respectively, said means comprising a housing defining a chamber therein, first means defining an inlet opening of a first predetermined size communicating with said chamber and coupling the latter with said ink catcher, second means defining a first outlet opening of a similar size as said inlet opening, communicating with said chamber and coupling the latter with said vacuum source and third means defining a second outlet opening of a second

predetermined size smaller than said first predetermined size, communicating with said chamber and coupling the latter with said evacuated ink return tank, said third means including conduit means extending into said chamber with an end thereof positioned near the floor of said chamber, whereby ink and air are drawn into said chamber through said inlet by said vacuum source at said first flow rate, the air being drawn out of said chamber through said first outlet opening and said ink being separated by gravity in said chamber and thereafter being drawn from said chamber to said evacuated ink return tank for storage therein through said conduit means and said second outlet opening at said second, slower flow rate, said ink and air passing through said chamber with no storage of ink therein.

4,023,183

ROTARY DEFLECTION ELECTRODES IN AN INK JET SYSTEM PRINTER

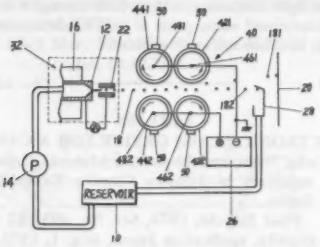
Rikuo Takano, Musashino; Yuji Sumitomo, Nara; Yoichi Yamamoto, Nara; Masahiko Aiba, Nara, and Tokio Maezawa, Yamatokoriyama, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo and Sharp Kabushiki Kaisha, Osaka, both of, Japan

Filed Oct. 31, 1975, Ser. No. 627,652

Claims priority, application Japan, Oct. 31, 1974, 49-126148

Int. Cl.² G01D *15/16*

U.S. Cl. 346—75 **11 Claims**



1. In combination with an ink jet system printer which emits charged ink droplets from a nozzle toward a record receiving member and selectively deflects said ink droplets by deflection means and records desired symbols on said record receiving member with said selectively deflected ink droplets, the deflection means comprising:

a high voltage source;

a pair of rotary deflection electrode means connected with said high-voltage source to establish a high-voltage electric field between said pair of rotary deflection electrode means; and

cleaning means continuously juxtaposed with said rotary deflection electrode means to clean said rotary deflection electrode means during rotation thereof.

4,023,184

THERMAL MATRIX TYPE PRINTING HEAD

Stephen L. Stillman, Jr., Nashua, N.H., assignor to MFE Corporation, Salem, N.H.

Filed Oct. 6, 1975, Ser. No. 619,589

Int. Cl.² G01D *15/10*

U.S. Cl. 346—76 R **9 Claims**

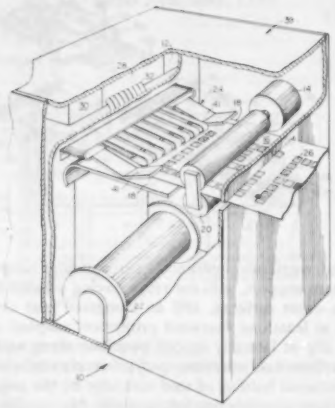
1. A thermal printing head for recording information on a thermally sensitive recording medium in response to intermittent electrical printing signals, said printing head comprising:

A. a plurality of spaced printing elements, each said element including:

i. first and second spaced, electrically conductive leads forming a gap therebetween and constituting a support for said elements, and

ii. an electrically resistive heating layer including end portions adjoining portions of said first and second leads and a central portion spanning the gap thereby to be supported solely by said leads, said central portion including a printing area for contacting the medium.

B. means for supporting said leads thereby to orient said



printing areas in a predetermined array, said supporting means being spaced from said printing areas thereby to form an air space between said support means and the central portions of said printing elements, and

C. means for coupling selectively the intermittent printing signals to said leads in said printing elements to energize selectively each said printing element thereby to heat said resistive material in the gap and mark that portion of the recording medium that then contacts said printing area.

4,023,185

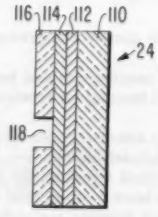
ABLATIVE OPTICAL RECORDING MEDIUM

Allen Bloom, East Windsor; Robert Alfred Bartolini, Trenton, and Alan Edward Bell, East Windsor, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 19, 1976, Ser. No. 668,748

Int. Cl.² G01D *15/34*

U.S. Cl. 346—135 **13 Claims**

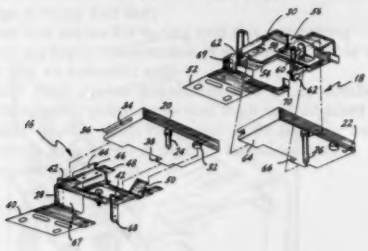


1. In an ablative optical recording medium which comprises a light reflecting material coated with a light absorbing layer, the improvement which comprises employing as the light absorbing layer an amorphous layer of 4-phenylazo-1-naphthylamine.

4,023,186
DISPOSABLE MARKER AND HOLDER

William A. Tallerico, Willingboro, N.J., assignor to Graphic Controls Corporation, Cherry Hill, N.J.

Filed Aug. 5, 1975, Ser. No. 602,106
Int. Cl.² G01D 15/16
U.S. Cl. 346—140 A 10 Claims

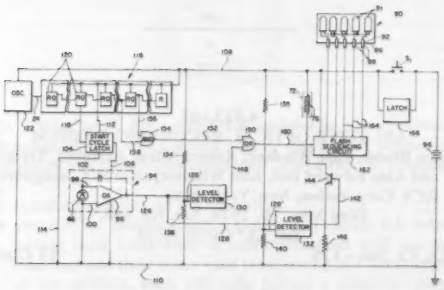


1. Flat, rectilinear instrument pen cartridge adaptable to top or bottom support, said cartridge having parallel flat top and bottom outer surfaces, and an elongated rear outer surface having at least one rearward projection adapted to engage a spring clip at laterally spaced positions along said elongated rear surface, said rearward projection also adapted to facilitate frictional holding of said cartridge by the engagement of said spring clip therein, substantially flat parallel outer side surfaces, and a pen nib projecting downwardly from said bottom surfaces.

4,023,187
EXPOSURE CONTROL SYSTEM WITH FILL FLASH RACE CONDITION

Edwin K. Shenk, Westford, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1975, Ser. No. 619,384
Int. Cl.² G03B 7/16
U.S. Cl. 354—27 22 Claims

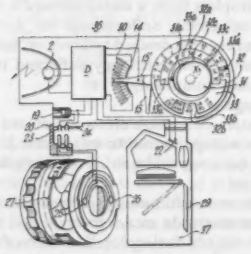


1. A photographic camera comprising:
a housing;
an objective lens mounted on said housing;
means within said housing for receiving a source of electrical energy;
means operatively associated with said housing for receiving a source of artificial illumination, said receiving means including electrical terminals for electrically communicating with the source of artificial illumination;
means within said housing for defining a film exposure plane;
a blade assembly mounted and arranged within said housing for displacement from an initial closed arrangement wherein said blade assembly precludes scene light from impinging on said exposure plane to a second arrangement wherein said blade assembly defines a maximum aperture through which scene light is permitted to impinge on said exposure plane and then to a final closed arrangement wherein said blade assembly again precludes scene light from impinging on said exposure plane, such a displacement of said blade assembly serving to define an exposure interval during which scene light is incident upon said film exposure plane;
scene light detecting means energizable by the source of electrical energy for providing an output signal in correspondence to the amount of scene light detected subsequent to the commencement of an exposure interval; and
means, at least in part energizable by the source of electrical energy, for initiating the displacement of said blade assembly from its said initial closed arrangement towards it said second arrangement thereby commencing a particular exposure program defined by a plurality of exposure parameters and then, responsive to said output signal of said scene light detecting means reaching a first predetermined value, for effecting the displacement of said blade assembly into its said final closed arrangement, and further, responsive to said output signal of said scene light detecting means reaching a second predetermined value less than said first predetermined value prior to said blade assembly reaching its said second arrangement, for initiating the electrical energization of said terminals to effect the firing of the source of artificial illumination and otherwise responsive to the expiration of a predetermined time delay prior to which said blade assembly at least reaches said second arrangement for initiating the electrical energization of said terminals to effect the firing of the source of artificial illumination when said output signal of said scene light detecting means fails to reach said second predetermined value prior to said blade assembly reaching its said second arrangement.

4,023,188
ELECTRONIC FLASH DEVICE FOR A CAMERA

Hiroshi Ueda, Nara, and Motonobu Matsuda, Izumi, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 30, 1974, Ser. No. 493,182
Claims priority, application Japan, Aug. 1, 1973, 48-86950
Int. Cl.² G03B 7/16, 15/05
U.S. Cl. 354—33 13 Claims



9. An electronic flash device for a camera, comprising
an electronic flash tube;
storing means for storing a voltage potential; operating means for flashing said flash tube by application of the stored voltage potential thereto, to produce a flash of light;
integrating means for integrating an amount of the light reflected from an object which is illuminated by said flash of light, and for cutting off the flashing of said flash tube when the integrated amount of light reaches a reference level, said integrating means comprising a first light sensitive element facing in the direction toward which the flash light is emitted from said flash tube;

at least one second light sensitive element positioned to receive light of said flash which enters the camera through the aperture thereof and which is reflected off film located in the camera;

means for connecting said second light sensitive element with said integrating means;

means for disabling the function of said first light sensitive element;

variable setting means for setting said reference level;

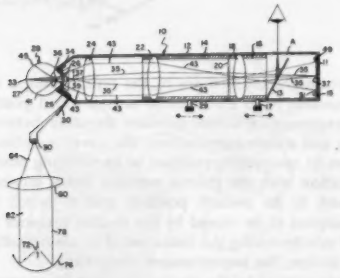
a first movable member movable by a user in dependence upon the sensitivity value of a film to be used in the camera and provided with a first index; and

a second movable member movable for varying said setting means in dependence upon the position of said second member, the position of said second member relative to said first member being indicative of and determined in conformity with an aperture value set in the camera, whereby said reference level setting means is controlled in conformity with the sensitivity value of the film used in the camera, added to the aperture value set in the camera, said second member being provided with a second index to be coincided with said first index for fixing the position of said second member relative to said first member as said connecting means connects said second light sensitive element with said integrating means.

4,023,189
WIDE ANGLE FUNDUS ILLUMINATION AND PHOTOGRAPHY APPARATUS

Jacques P. Govignon, Malden, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Mar. 29, 1974, Ser. No. 455,975
Int. Cl.² G03B *29/00*
U.S. Cl. 354—62 **18 Claims**

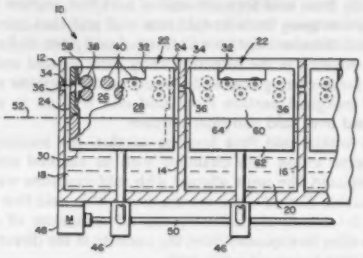


1. An illuminated, reduced-glare, image receiver for viewing an object comprising, means for illuminating said object, a first lens means mounted proximate the illuminated object for directing the light field reflected therefrom into a beam having diverging and converging rays a collimating means mounted on the axis of said beam and spaced from said first lens so that the intermediate image of the beam transmitted from said first lens is positioned therebetween, which lens lessens the divergence of the beam rays passing therethrough; a focusing lens assembly positioned following said collimating lens means, in the path of said light beam and axially moveably mounted with respect thereto, said focusing lens assembly having decollimating lens means mounted in fixably spaced relationship to a diaphragm and objective lens means mounted proximate said diaphragm on the axis of said beam; and an image receiving means positioned on the remote side of said objective lens means for receiving said image such that the beam from said collimating lens means enters said focusing lens assembly through the decollimating lens means which directs the rays of said beam to said objective lens means through said diaphragm, which reduces glare components of said beam; at least some of the elements of the focusing lens assembly being moved along the beam until said beam is focused by the objective lens means on said image receiving means.

4,023,190
FILM PROCESSOR

Werner A. Fassler, Rochester, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed June 2, 1975, Ser. No. 582,873
Int. Cl.² G03D *3/08*, *3/02*, *13/02*
U.S. Cl. 354—319 **7 Claims**



1. A film processor comprising:

a. a liquid tight reservoir for containing a supply of film processing liquid;

b. a non-liquid tight film processing tank supported in said reservoir above the bottom thereof, said tank having separable upper and lower portions resting one on the other with the junction therebetween affording means for liquid to flow between and seek a common level in said reservoir and film processing tank;

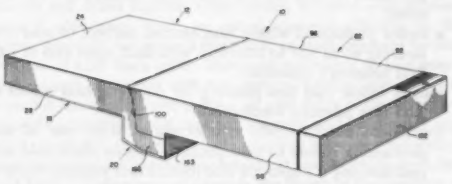
c. film transport means including a plurality of film engaging horizontally oriented drive rollers journaled at their ends to said upper portion above said common level of liquid for transporting a film in a straight line path of travel through said film processing tank; and

d. a pump for pumping processing liquid from said reservoir into said film processing tank to raise the level of liquid in said film processing tank to a second level above said film path of travel, said pump producing sufficient head to maintain said second level as liquid tends to flow from said non-liquid tight processing tank and through said junction back into said reservoir.

4,023,191
CAMERA BACK APPARATUS

Rolf M. Augustin, Jr., Wellesley, and Norman W. Cutler, Jr., Braintree, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 4, 1975, Ser. No. 628,486
Int. Cl.² G03B *17/50*
U.S. Cl. 354—86 **29 Claims**



1. A camera back for selective attachment to a front camera body, said camera back comprising:

a first housing including first and second fixedly connected sections, said first section including a substantially planar forward wall having an exposure aperture and including a marginal section comprising tactile discontinuities on its

forward face extending around said exposure window configured to facilitate a releasable light sealed connection of said camera back to the front camera body, said first section additionally including a substantially planar rear wall spaced a substantially short distance from said forward wall in parallel relationship thereto by a pair of parallel side walls and an end wall, said first section defining a chamber having an open end opposite said end wall through which a film cassette including a plurity of unexposed film units of the self-developing type stacked in an array may be inserted into said chamber, said second section including a plurality of walls and extending outwardly from said forward wall of said first section in the direction away from its said rear wall and also extending a predetermined distance in front of said open end of said first housing in the direction away from its said end wall and further being disposed entirely on the opposite side of said marginal portion from said end wall so as not to extend over said marginal portion;

means within said first housing section for locating the cassette within said chamber with its stacked array of unexposed film units aligned with said exposure window;

an actuable film advance mechanism within said first housing for selectively initiating the advancement of a film unit after its exposure from the cassette in the direction of said first housing's open end;

a substantially flat second housing;

means for pivotally connecting said second housing to said first housing for displacement between a first position wherein said second housing precludes the insertion of the film cassette into, or its removal from, said chamber and a second position wherein access is available to said open end of said chamber for purposes of inserting and removing the film cassette from said chamber, said second housing including substantially planar forward and rear walls spaced a substantially short distance apart by a pair of parallel side walls and an end wall to define, when said second housing is disposed in its said first position, a chamber having an open end facing the first housing's open end substantially constituting extensions of said first housing's rear and side walls, said second housing's chamber extending a sufficient length in the direction away from its said open end to receive and store the film units after their exposure within said first housing, said short distance said second housing's forward wall is spaced from its said rear wall and said predetermined distanced said first housing's second section extends in front of its said open end serving, when said seond housing in its said first position, to locte a portion of said first housing's second section above a portion of said second housing with said first housing's second section extending only a relatively short distance along said second housing in the direction of said second housing's end wall;

a pair of juxtaposed processing rollers connected to said second housing adjacent its said open end for movement therewith to be located to receive therebetween a leading edge of an exposed film unit when said second housing is in its said first position and as the exposed film unit is advanced by said film advance mechanism from the cassette;

a motor positioned within said second section of said first housing so as not to interfere with said open end of said first housing's chamber;

means within said first housing for coupling said motor to said film advance mechanism;

means for automatically connecting at least one of said processing rollers to said coupling means when said second housing is displaced into its said first position from its said second position, whereby when said motor is energized said rollers cooperate with said film advance mechanism to advance the exposed film unit from said first housing and deposit the exposed and processed film unit in said second housing; and

complementary means respectively formed on peripheral edges of appropriate ones of said walls of said first and second sections of said first housing and on peripheral edges of appropriate ones of said walls of said second housing to effect a light tight mating arrangement between said first and second housings when said second housing is disposed in its said first position and said camera back is connected to the front camera body whereby, at such time, said first and second housing sections serve to define a first chamber sealed from ambient light in which the film units can be retained prior to and during their exposure and a second chamber sealed from ambient light in which the film units may be stored following their exposure.

4,023,192

SHUTTER MECHANISM

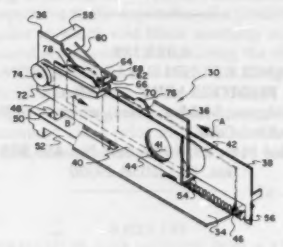
Horst Simon, and Heinz G. Bethmann, both of Fellbach, Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 9, 1976, Ser. No. 656,484

Claims priority, application Germany, Feb. 21, 1975, 2507431

Int. Cl.² G03B *15/03*

U.S. Cl. 354—147 **6 Claims**



1. In a photographic camera of the type having a shutter member movable from a cocked to an uncocked position to effect an exposure, a cover member movable between an uncovering and a covering position, the cover member being moved from its uncovering position to its covering position in synchronization with the shutter member being moved from its uncocked to its cocked position and a switch having contacts adapted to be closed by the shutter member for the purpose of synchronizing the initiation of an electrically operated flash device, the improvement comprising:

first means carried by the shutter member for momentarily closing the switch during movement of the shutter member from its cocked to its uncocked position and for opening the switch prior to the shutter member reaching its uncocked position; and

second means for preventing switch closure when the shutter member is moved from its uncocked to its cocked position.

4,023,193

PROCESS AND APPARATUS FOR REPLENISHING DEVELOPER IN PHOTOPRINTING MACHINES

Herbert Schröter, Taunusstein, and Kurt Albrecht Wehlmann, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 18, 1974, Ser. No. 533,844

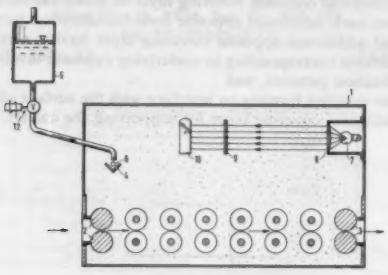
Claims priority, application Germany, Dec. 21, 1973, 2363757

Int. Cl.² G03D *13/00*

U.S. Cl. 354—298 **8 Claims**

4. An apparatus for replenishing developing medium in a developing chamber of a photoprinting machine comprising a developing chamber having a developer gas therein, a light

source, at least one light-sensitive element upon which rays from the light source impinges after passing a certain layer thickness of said developer gas, at least one optical infra-red filter mounted between the light source and the light-sensitive



element, at least one electrical comparator means for comparing an electrical signal from the light-sensitive element with a predetermined nominal electrical value, and means controlled by said comparator means for replenishing developing medium in said chamber.

4,023,194

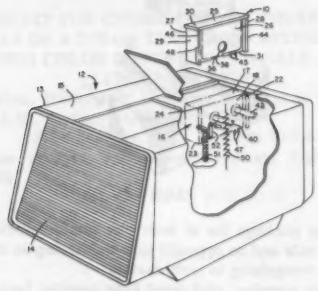
PHOTOGRAPHIC SYSTEM EMPLOYING A CASSETTE CARRYING A PROCESSING INDICATOR

John F. Batter, Jr., Lincoln, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 319,487, Dec. 29, 1972, abandoned. This application May 6, 1974, Ser. No. 467,266

Int. Cl.² G03D *5/00*

U.S. Cl. 354—317 **9 Claims**



6. A photographic system comprising:

a photographic film cassette comprising:

a housing configured for retaining a strip of exposed film;

means for alternately cooperating with a projector apparatus for performing a plurality of operational programs comprising a predetermined fluid treatment program for treating such strip of photographic material with processing fluid to provide viewable images on such film strip and at least one other operational program for projecting images recorded on such strip;

means for indicating said predetermined program and whether said predetermined program has been performed, said indicating means including a pair of contacts configured to provide an open circuit when said predetermined program has been performed and to provide a closed circuit having a given electrical condition indicative of said predetermined program when said predetermined program has not been performed; and

projector apparatus comprising:

means for operably receiving said cassette;

selectively operable means for performing any of a plurality of fluid treatment programs, including one fluid treatment program conforming to said predetermined program, and for thereafter performing said at least one other operational program; and

control means adapted to be disposed in operative relation with said indicating means when said cassette is received in said apparatus for controlling said selectively operable means so as to perform only said one fluid treatment program of said plurality of said fluid treatment programs when said indicating means provides said given electrical condition and to perform said at least one other operational program when said indicating means provides an open circuit.

4,023,195

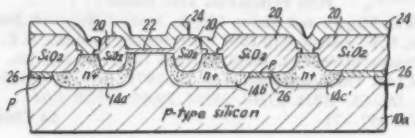
MOS FIELD-EFFECT TRANSISTOR STRUCTURE WITH MESA-LIKE CONTACT AND GATE AREAS AND SELECTIVELY DEEPER JUNCTIONS

Paul Richman, St. James, N.Y., assignor to SMC Microsystems Corporation, Hauppauge, N.Y.

Continuation of Ser. No. 517,299, Oct. 23, 1974, abandoned. This application Jan. 30, 1976, Ser. No. 653,912

Int. Cl.² H01L *29/78*

U.S. Cl. 357—23 **3 Claims**



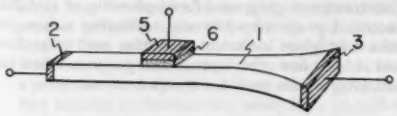
1. An MOS transistor structure comprising a substrate of a first conductivity type; regions including spaced source and drain regions of a second conductivity type formed in one major surface of said substrate, an active channel being established in said substrate between said source and drain regions, an insulating thick oxide layer selectively formed on said substrate and having a portion extending below said major surface and into each of said source and drain regions, an aluminum layer selectively formed over said thick oxide layer, said portion establishing in each of said source and drain regions a perimetral side wall of a mesa-like contact segment extending to said major surface, said mesa-like contact segments each having an upper surface at which contact of said source and drain regions, respectively, is made with sections of said aluminum layer, an outer segment adjacent to the active channel and spaced from said contact segment by said portion of said thick oxide layer and extending to said major surface and in contact with said active channel, and a central segment underlying said portion of said thick oxide layer and extending between said contact segment and said outer segment, such that the depth of the junction between said source and drain regions and said substrate at said contact segments is at least 2.5 microns and exceeds the depth of the junction at said central segments by at least 0.5 micron, and said perimetral wall of said contact segment is surrounded by said portion of said insulating oxide layer; whereby the likelihood of aluminum spiking through said source and drain regions to which aluminum contact is made into said substrate in both the vertical and horizontal directions is effectively prevented.

4,023,196

NEGATIVE RESISTANCE ELEMENT COMPOSED OF A SEMICONDUCTOR ELEMENT

Shoei Kataoka, and Hiroshi Tateno, both of Tanashi, Japan, assignors to Kogyo Gijutsuin, Japan

Filed Aug. 25, 1969, Ser. No. 852,550
Claims priority, application Japan, Aug. 27, 1968, 43-60913
Int. Cl.[2] H01L 27/24, 27/26, 29/66
U.S. Cl. 357—57 16 Claims



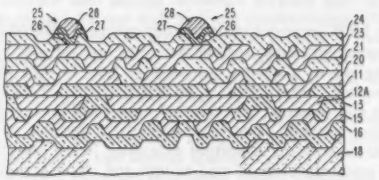
5. A solid state negative resistance device comprising an anode structure, a cathode structure, and an active body of bulk semiconductor material therebetween that microscopically exhibits the electron-transfer effect when biased with a selected electric field above the characteristic threshold electric field and has an n_0L product, where n_0 is the equilibrium charge carrier density and L is the length of the active semiconductor body, below the critical value needed to support Gunn oscillation, wherein the cross-sectional area of said active semiconductor body near the anode is made larger than the smallest cross-sectional area in the remaining part of the said active semiconductor body to maintain the selected electric field in the active semiconductor body at an approximately uniform value above the threshold electric field over the entire length of the active semiconductor body.

4,023,197

INTEGRATED CIRCUIT CHIP CARRIER AND METHOD FOR FORMING THE SAME

Ingrid E. Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 461,078, April 15, 1974, Pat. No. 3,918,148. This application June 25, 1975, Ser. No. 590,348
Int. Cl.[2] H01L 23/48, 29/34, 29/06; H02B 1/04
U.S. Cl. 357—71 14 Claims



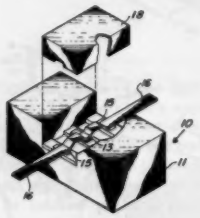
1. An integrated circuit chip carrier comprising
an insulative layer of dielectric material having a first planar surface and an opposite planar surface
a first level metallization pattern formed on said first planar surface,
a first covering layer of dielectric material over said metallization pattern and said first surface, said first covering layer having elevated portions corresponding to said first metallization pattern,
at least one additional level metallization pattern on said first covering layer,
an additional covering layer of dielectric material over each additional level metallization pattern, said additional covering layer having elevated portions corresponding to the underlying metallization patterns,
an opposite level metallization pattern formed on said opposite planar surface,
an opposite covering layer of dielectric material over said opposite level metallization pattern and said opposite surface, said opposite covering layer having elevated portions corresponding to said opposite level metallization pattern,
at least one additional opposite level metallization pattern on said opposite covering layer,
an additional opposite covering layer of dielectric material over each additional opposite level metallization pattern, said additional opposite covering layer having elevated portions corresponding to underlying opposite level metallization patterns, and
a base member forming an interface with the surface of said additional covering layer for supporting the carrier.

4,023,198

HIGH FREQUENCY, HIGH POWER SEMICONDUCTOR PACKAGE

Hugh R. Malone; Michael L. Matson, both of Phoenix, and Bernhard A. Ziegner, Gilbert, all of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 497,988, Aug. 16, 1974, abandoned. This application May 17, 1976, Ser. No. 687,440
Int. Cl.[2] H01L 27/02, 23/02, 23/48
U.S. Cl. 357—81 12 Claims

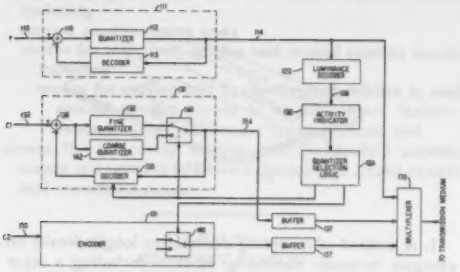


1. A device package for at least one semiconductor chip having a first side and an opposite side and having an inherent capacitance, comprising in combination:
a metal base member, said metal base member being fabricated of oxygen free high conductivity copper;
said at least one semiconductor chip being bonded on said first side to said metal base member and being in electrical contact therewith;
at least one insulator member having a first side and an opposite side, said first side of said at least one insulation member being bonded to said metal base member; and
at least one low pass filter matching means for tuning out said semiconductor capacitance, said at least one low pass filter matching means comprising an electrical conductor being in electrical contact with and physically bonded to said opposite side of said at least one semiconductor chip and being in contact with and physically bonded to said opposite side of said at least one insulator member, said electrical conductor having at least one raised portion with respect to said opposite side of said at least one semiconductor chip and with respect to said opposite side of said at leat one insulator member said at least one raised portion being located between said at least one semiconductor chip and said at least one insulator member.

4,023,199
METHOD AND APPARATUS FOR ENCODING COLOR VIDEO SIGNALS

Arun Narayan Netravali, Matawan, and Charles Benjamin Rubinstein, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 9, 1976, Ser. No. 665,188
Int. Cl.² H04N *9/32*
U.S. Cl. 358—13 **13 Claims**



11. A method of encoding at least one of the chrominance signals which provide color information for a selected portion of a scene represented by a luminance signal, comprising the steps of:

generating, in response to said luminance signal, an activity signal indicative of the spatial activity in said selected scene portion;

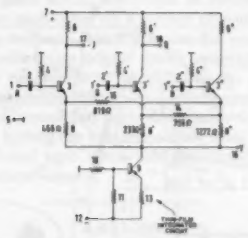
generating from said chrominance signal a digital representation thereof having a controllable degree of precision; and

controlling in response to said activity signal, the degree of said precision in inverse relation to said activity signal.

4,023,200
CIRCUIT FOR COMBINING THE THREE COLOR SIGNALS OF A COLOR TELEVISION SYSTEM TO FORM TWO COLOR DIFFERENCE SIGNALS AND A LUMINANCE SIGNAL

Heinz Hess, Weiterstadt, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 24, 1975, Ser. No. 616,411
Claims priority, application Germany, Sept. 28, 1974, 2446538
Int. Cl.² H04N *9/52, 9/09*
U.S. Cl. 358—30 **4 Claims**

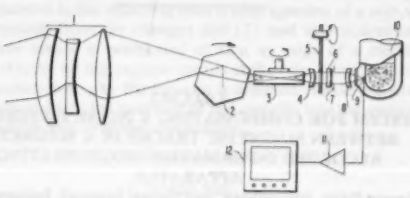


1. A matrixing circuit for NTSC color television systems operative for receiving R, G and B color signals and deriving therefrom each of the requisite NTSC color difference signals −I and Q and also the NTSC luminance signal Y, the matrixing circuit comprising a voltage source having first and second source terminals; a first, a second and a third transistor each having a base, a collector and an emitter, the first, second and third transistors being respectively adapted to receive at their bases the R, G and B color signals, the collectors of the three transistors being all connected to the first source terminal; a first, a second and a third emitter resistor each having one terminal connected to the emitter of a respective one of the three transistors, the three other terminals of the emitter resistors being connected in common to a common junction; a constant current source connected between said common junction and said second source terminal, the conductivities of the three emitter resistors standing in the ratio $k_1:k_2:k_3$, where k_1, k_2 and k_3 are the coefficients in the NTSC luminance signal equation $Y = k_1R + k_2G + k_3B$, so that an NTSC luminance signal Y develops at said common junction upon application of R, G and B color signals to the bases of the first, second and third transistors, respectively; and a first phase shift resistor connected between the emitters of the first and third transistors and a second phase and third transistors, the first and second phase shift resistors having resistance values such as to cause the development of the NTSC color difference signals −I and Q at the collectors of the first and second transistors, respectively, upon application of R, G and B color signals to the bases of the first, second and third transistors, respectively.

4,023,201
INFRARED THERMOGRAPHY FOR DETERMINING EQUIPMENT TEMPERATURES IN OIL WELL FIRES

Kenneth F. Faulkner, Houston, Tex., assignor to Infrared Surveys, Incorporated, Houston, Tex.

Filed Apr. 26, 1976, Ser. No. 680,420
Int. Cl.² A62C *3/04;* **H04N** *7/18*
U.S. Cl. 358—113 **5 Claims**



5. The method of producing stable infrared imagery by the use of infrared thermography for determining equipment temperatures in oil well fires comprising the steps of:

producing an infrared image of an oil well fire which is to be analyzed,

scanning the infrared image in two dimensions,

selectively filtering the scanned infrared image by first passing the infrared rays from the scanned image within a first wavelength band of 3.413 to 4.073 μm and then passing the infrared rays from the scanned image within a second wavelength band between 3.858 to 4.033 μm,

focusing the selectively filtered infrared image on an infrared detector to generate an electrical signal which varies according to the point-by-point temperature variation along the flame front of the oil well fire, and

modulating the intensity of the electron beam of a T.V. monitor to produce a stable visual image in real time.

4,023,202
TELEVISION TRACKING SYMBOL GENERATOR

Anthony C. H. Louie, and Robert E. Munn, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

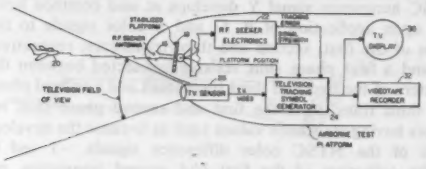
Filed Dec. 24, 1975, Ser. No. 644,289
Int. Cl.² H04N *3/16*
U.S. Cl. 358—125 **6 Claims**

1. A television tracking symbol generator for use in flight testing of airborne seeker systems which acquire and track airborne targets radiating RF energy and provides signals

proportional to the received signal strength, tracking error signals and platform position signals comprising:

a. a first circuit means for generating a first video signal to form a first video symbol in response to a received signal above a predetermined value,

b. a second circuit means for generating a second video signal to form a second video symbol in response to the tracking error signal from the seeker,



c. a third circuit means for generating a third video signal to form a third video symbol in response to a signal representing the relative position of the seeker stabilized platform,

d. video signal mixer circuit means coupled to said first, second and third circuit means for combining said first, second and third video signals into a composite video signal for displaying said first, second and third video symbols on a television monitor.

4,023,203

SYSTEM FOR COMPENSATING A PHASE DIFFERENCE BETWEEN MAGNETIC TRACKS IN A MAGNETIC RECORDED INFORMATION REGENERATING APPARATUS

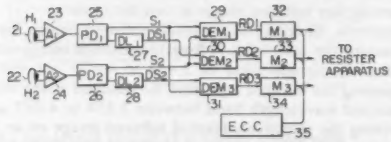
Masaru Baba, Sagamihara, and Shuhei Inamori, Isehara, both of Japan, assignors to Fujitsu Ltd., Kanagawa, Japan

Filed Nov. 26, 1975, Ser. No. 635,328

Claims priority, application Japan, Dec. 4, 1974, 49-139821

Int. Cl.² G11B *5/43*

U.S. Cl. 360—26 **16 Claims**



1. System for compensating a phase difference netween tracks of a recording medium used in a magnetic recorded information regenerating apparatus which regenerates signals recorded on a plurality of said magnetic tracks and which composes and demodulates said signals so as to obtain a read output signal comprising:

a plurality of delay means for delaying signals which are recorded on each track of said recording medium;

a first means for composing said signals;

a plurality of second means for composing said delayed signal of one track and said signals of each track except said one track;

detecting means for detecting whether the outputs of said first and second means are correct or not, and;

means for selecting the correct output from said outputs of said first and second means so as to use said correct output.

4,023,204

MAGNETIC RECORDING

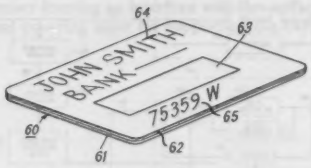
Cyril Arthur Lee, Maidenhead, England, assignor to EMI Limited, Hayes, England

Filed Oct. 15, 1975, Ser. No. 622,514

Claims priority, application United Kingdom, Oct. 16, 1974, 44749/74

Int. Cl.² G11B *5/02;* **G06K** *19/06;* **G11B** *25/04*

U.S. Cl. 360—56 **10 Claims**



1. A method of recording information longitudinally on an elongate magnetic recording medium including a layer of magnetically anisotropic particles which are permanently aligned with their easy axes of magnetization in adjacent areas of a pattern of areas in the medium predominately on a respective one of two mutually inclined alignment directions, including providing a transport means for relative motion of the medium, along its length, and providing a recording head having a gap, aligning a gap of the recording head with respect to the medium to pass over the pattern of areas with equal inclination to each of said alignment directions and energising the head to create a magnetic field to magnetise pattern areas of the medium of both alignment directions in accordance with information to be recorded whereby resolved components of remanent magnetism produced by adjacent areas of said magnetised medium in a direction other than an alignment direction and in which the recording head gap is aligned are substantially equal and cooperate in the recording of the information.

4,023,205

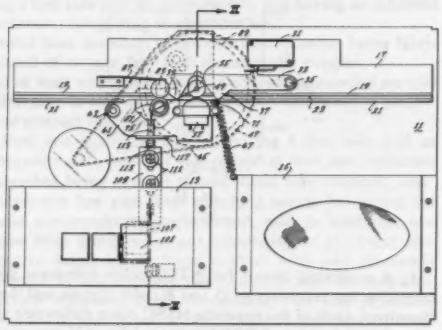
AUDIOCARD RETURN MECHANISM

Donald E. Warner, Studio City, Calif., assignor to Audiotronics Corporation, North Hollywood, Calif.

Filed Jan. 19, 1976, Ser. No. 649,979

Int. Cl.² G11B *19/02;* **G06K** *7/01*

U.S. Cl. 360—74 **15 Claims**



1. In a card handling machine,

transducer means for aurally reproducing matter recorded on a card,

means for driving a card past said transducer means in a first direction in which matter recorded on such a card is aurally reproduced including

capstan means for urging such a card against said transducer means, and

means for rotating said capstan means including

motor means and

flywheel means interconnecting said motor means and said capstan means,

means for driving a card past said transducer means in a second direction, to return such a card to a position in which it may be driven by said first direction drive means, including

second capstan means and

means for selectively driving said second capstan means including

means for moving said flywheel means relative to said second capstan means to cause contact therebetween to drive said second capstan means, and

means for selectively moving said first-recited capstan means to a position in which it cannot urge a card against said transducer means.

4,023,206

HUMIDITY SENSOR

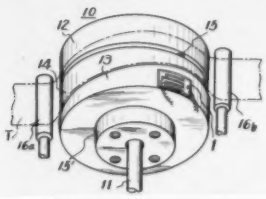
Atsushi Nishibe, Machida, and Yoshitaka Kikuchi, Atsugi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sept. 25, 1975, Ser. No. 616,666

Claims priority, application Japan, Oct. 1, 1974, 49-118366[U]

Int. Cl.² G11B *21/02, 15/18, 15/60;* **G01W** *1/02*

U.S. Cl. 360—75 **2 Claims**



1. A video tape recording and/or reproducing apparatus comprising:

a tape guide drum around which a tape is guided and including rotary head means for scanning the tape guided on the drum as the tape is longitudinally driven;

tape drive means for driving the tape around the guide drum;

a humidity sensor including an insulating film adhered to said tape guide drum, and a pair of electrodes arranged adjacent to each other on a surface of said insulating film with a gap between said electrodes for providing a resistance therebetween which varies generally inversely in respect to the degree of humidity in the ambient atmosphere; and

circuit means connected with said sensor for sensing said resistance halting the rotation of said head means and the driving of said tape when said resistance falls below a predetermined value.

4,023,207

VIDEO TAPE CASSETTE CHANGING APPARATUS

Thorsten P. Cook, R.R. 1, Box 21A, Pound Ridge, N.Y. 10576

Filed June 25, 1975, Ser. No. 590,147

Int. Cl.² G11B *15/68*

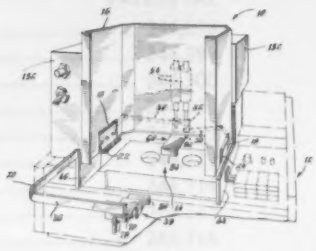
U.S. Cl. 360—92 **9 Claims**

1. A video tape cassette changer for use with a video cassette tape player that has a cassette receiving means including a cassette raising and lowering mechanism which receives a cassette at a predetermined angle from horizontal for lowering a received cassette into a play position and raising a rejeced cassette out of the play position comprising:

a chute positioned in proximity to the player receiving means and shaped to receive a plurality of stacked video tape cassettes for playing;

means for supporting the stack of cassettes and for releasing the lowest cassette in the stack;

cassette insertion/extraction means positioned in proximity to the player receiving means and the support means for inserting a released cassette in the receiving means and for extracting a raised cassette from the receiving means and including (1) a rear extraction surface for contacting a raised cassette, (2) an insertion plate that has a front insertion surface for contacting a released cassette and



(3) means for resiliantly attaching said plate to said insertion/extraction means, and

means for synchronizing the support means and the insertion/extraction means with the player receiving means to control the changer so that (1) a cassette for playing is inserted in the receiving means after ejection of a rejected cassette from the changer and (2) said insertion/extraction means is positioned so that an edge of a cassette released by the support means strikes the front insertion surface whereby the cassette is oriented at said predetermined angle for insertion of the cassette into the cassette raising and lowering mechanism.

4,023,208

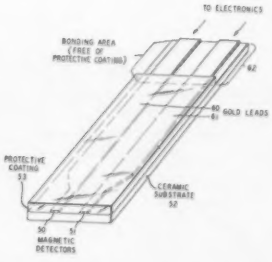
PROTECTIVE COATINGS FOR A MAGNETIC TAPE SENSOR

Eugene David Feit, Berkeley Heights, and Larry Flack Thompson, Gillette, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 575,618, May 8, 1975, abandoned. This application July 8, 1976, Ser. No. 703,512

Int. Cl.² G11B *5/22*

U.S. Cl. 360—122 **7 Claims**



1. In a magnetic tape sensor adapted for reading magnetically coded data contained in a magnetic tape, the sensor comprising:

a housing containing a sensing head for detecting magnetic field variations as the magnetic tape passes it, the sensing head comprising a rigid support, a magnetic sensing element arranged on the rigid support, and a protective

coating overlying the sensing element; and a code conversion circuit connected to the sensing element for converting the variations in magnetic field to electrical signals, the invention characterized in that the protective coating is a polymer of one or more of the following:

a. 1-butane carbamic acid 2-methacryloyloxyethyl ester,
b. 1-butane carbamic acid 2-acryloyloxyethyl ester,
c. a mixture of isomers 2,2,4 - and 2,4,4-trimethyl-1, 6-hexane dicarbamic acid di(2-methacryloyloxyethyl)ester,
d. a mixture of isomers 2,2,4 - and 2,4,4-trimethyl-1, 6-hexane dicarbamic acid di(2-acryloyloxyethyl)ester,
e. di(4-cyclohexylcarbamic acid 2-methacryloyloxyethyl ester)methane,
f. di(4-cyclohexylcarbamic acid 2-acryloyloxyethyl ester)methane.

DESIGN PATENTS

GRANTED MAY 10, 1977

ERRATA

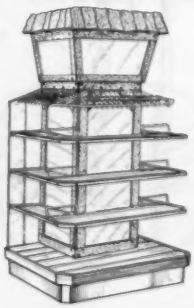
For CLASS	See PATENT NO.
013–028	244,298
014–096	244,299
014–036	244,300
014–037	244,301
014–073	244,312
014–005	244,313
024–038	244,314
024–064	244,315
024–001.1	244,316
024–007	244,317
028–089	244,318

DESIGNS

MAY 10, 1977

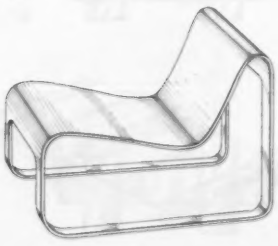
244,236
HELMET SAFETY ATTACHMENT
L. B. Kyle, 125 Elizabeth St., Holly Hill, Fla. 32017
Filed Apr. 10, 1975, Ser. No. 566,740
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—2

244,237
ILLUMINATED DISPLAY DEVICE
Alan K. Snyder, River Forest, Ill., assignor to Chicago Display Company, Melrose Park, Ill.
Filed Apr. 7, 1976, Ser. No. 674,395
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24



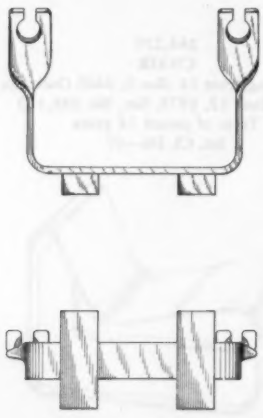
244,238
SUPPORT STAND FOR AN OSCILLOSCOPE OR SIMILAR ARTICLE
James Alexander Hill, Aloha, and David Ray Hargis, Hillsboro, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.
Filed Nov. 28, 1975, Ser. No. 636,232
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—29

244,239
CHAIR
Eric Laroye, Koningstraat 14 -Bus 2, 8400 Oostende, Belgium
Filed June 12, 1975, Ser. No. 586,123
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—75

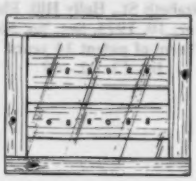


244,240
CHAIR
Leonard Eisen, 14 Lomas Lane, Montvale, N.J. 07645
Filed Aug. 13, 1975, Ser. No. 604,325
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—76

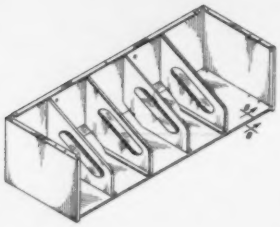
244,241
DISPLAY RECEPTACLE FOR EYE GLASSES OR THE LIKE
Stefan Engelman, 61-38 164 St., Flushing, N.Y. 11365
Filed Aug. 14, 1975, Ser. No. 604,708
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85



244,242
BRACELET DISPLAY RACK
Clarence Woycik, 760 Allen St., Ferndale, Mich. 48220
Filed May 3, 1976, Ser. No. 682,589
Term of patent 14 years
Int. Cl. D6—*04*; D20—*02*
U.S. Cl. D6—172

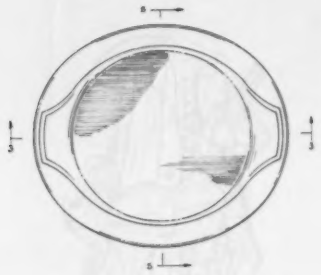


244,243
SHELF MODULE, OR SIMILAR ARTICLE
Thomas R. Hegg; Gerald T. Carlson, and Richard A. Sonnenberg, all of Michigan City, Ind., assignors to Interstate Industries, Inc., Mundelein, Ill.
Filed Dec. 17, 1975, Ser. No. 641,549
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—184



244,244
PANTS HANGER
Donald D. Burke, 2304 NE. Scandia Drive, Apt. 110, Kansas City, Mo. 64118
Filed Mar. 8, 1976, Ser. No. 664,970
Term of patent 3½ years
Int. Cl. D6—*08*
U.S. Cl. D6—247

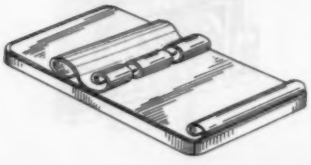
244,245
DINNER PLATE OR SIMILAR ARTICLE
George B. Jensen, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed May 7, 1975, Ser. No. 575,362
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1



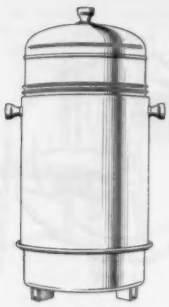
244,247
DINNER PLATE OR SIMILAR ARTICLE
George B. Jensen, Syracuse, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Division of Ser. No. 575,362, May 7, 1975. This application Sept. 15, 1976, Ser. No. 723,524
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—20

244,246
COVERED BOWL OR THE LIKE
Robert H. C. M. Daenen, Hekelgem, Belgium, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Sept. 10, 1975, Ser. No. 612,152
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17

244,248
HOLDER FOR FLATWARE OR THE LIKE
Manuel A. Anzures, 8636 S. Kingston, Chicago, Ill. 60617
Filed May 20, 1974, Ser. No. 471,795
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—74

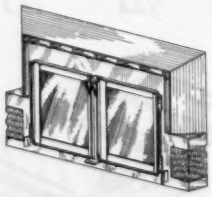


244,249
HOUSING FOR A CHARCOAL WATER SMOKER
Burl Boswell, and Heyman J. Manhein, both of Shreveport, La., assignors to Bosman Industries, Inc. (Entire), Shreveport, La.
Filed Mar. 8, 1976, Ser. No. 665,098
Term of patent 14 years
Int. Cl. D7—*04;* D15—*08*
U.S. Cl. D7—107

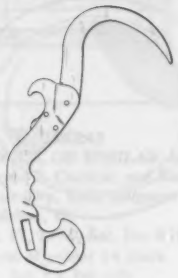


244,250
MOPHEAD
Douglas Layton Pratt, 21 Carmody St., Kooringal, Wagga Wagga, New South Wales 2615, Australia
Filed Feb. 10, 1975, Ser. No. 548,596
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—178

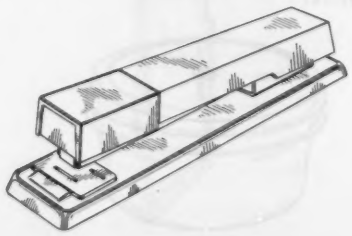
244,251
FIREPLACE SCREEN
Jerry McCallum, Box 6083, Spokane, Wash. 99207
Filed Sept. 10, 1975, Ser. No. 611,902
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—208



244,252
FIREMAN'S COMPOSITE TOOL
Alfred J. Ardis, Westbury, N.Y., assignor to Fireman's Composite Tool Corporation, Westbury, N.Y.
Filed Apr. 28, 1976, Ser. No. 680,978
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—26

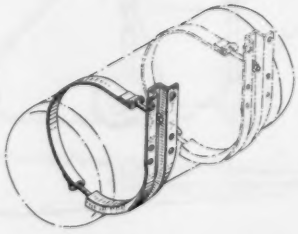


244,253
STAPLER
John J. Power, Westbury, N.Y., and Ernest M. Raasch, Fort Lee, N.J., assignors to Swingline, Inc., Long Island City, N.Y.
Filed Oct. 17, 1975, Ser. No. 623,554
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D8—50



244,254
WALLPLATE
Joan K. Creamer, Warwick, R.I., assignor to General Electric Company
Filed Nov. 18, 1974, Ser. No. 524,920
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

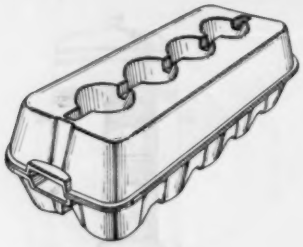
244,255
J-BRACKET FOR CYLINDRICAL FUEL TANKS OR SIMILAR ARTICLES
Gerald J. Snyder, Blasdell, N.Y., assignor to Snyder Tank Corporation, Hamburg, N.Y.
Filed Sept. 11, 1975, Ser. No. 612,230
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—355



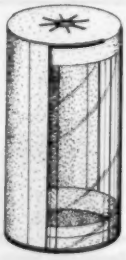
244,256
FOUR COMPARTMENT NESTED CONTAINER FOR COSMETICS OR THE LIKE
Evert Jan Dekker, Voorburg, Netherlands, assignor to Indola Cosmetics B.V., Rijswijk, Netherlands
Filed Feb. 4, 1975, Ser. No. 546,890
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—18

244,257
BOTTLE
Leopoldo Benguerel Godö, and Xavier Benguerel Godö, both of Paseo San Juan 45, Barcelona, Spain
Filed Nov. 20, 1974, Ser. No. 525,564
Claims priority, application United Kingdom, Oct. 29, 1974, 968500/74; Oct. 29, 1974, 968501/74; Oct. 29, 1974, 968502/74
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—31

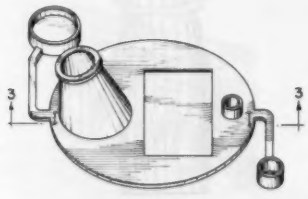
244,258
EGG CARTON
Jøgen Nilaud Petersen, Lyngby, Denmark, assignor to Aktieselskabet Brodrene Hartmann, Lyngby, Denmark
Filed Dec. 26, 1974, Ser. No. 536,562
Claims priority, application Denmark, July 4, 1974, 925/74
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—190



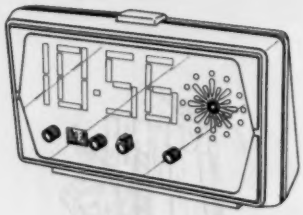
244,259
CYLINDRICAL DISPLAY CONTAINER FOR MERCHANDISE
Robert M. Bergstein, Cincinnati, Ohio, assignor to Bergstein Packaging Trust, Middletown, Ohio
Filed Apr. 28, 1976, Ser. No. 681,186
Term of patent 14 years
Int. Cl. D9—*03*; D20—*02*
U.S. Cl. D9—224



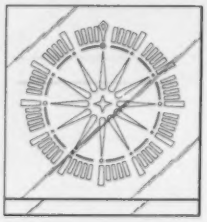
244,260
CONTAINER CLOSURE WITH POURING SPOUT
Robert L. Walker, 101 W. Main St., St. Charles, Ill. 60174
Filed Oct. 23, 1974, Ser. No. 517,174
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—275



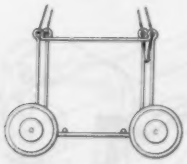
244,261
DIGITAL CLOCK
Shuichi Tamura, Tokyo, Japan, assignor to Tamura Electric Works, Ltd., Tokyo, Japan
Filed Sept. 11, 1975, Ser. No. 612,464
Claims priority, application Japan, May 2, 1975, 50-17293
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



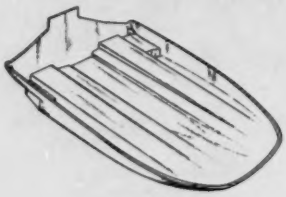
244,262
DIAL FOR CLOCK
Kenji Nakamura, Kamakura, Japan, assignor to Japan Suncrux Co., Ltd., Tokyo, Japan
Filed May 9, 1975, Ser. No. 575,931
Claims priority, application Japan, Nov. 12, 1974, 49-39560
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126



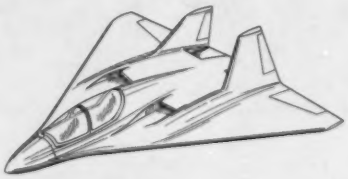
244,263
MOBILE CARRIER
Mary McGovern, 1806 Taft Ave., Hollywood, Calif. 90028
Filed Feb. 26, 1976, Ser. No. 661,716
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—25



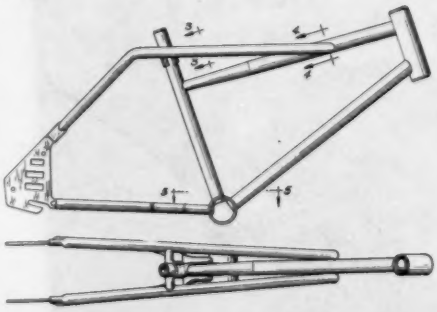
244,264
BOAT HULL
Darris E. Allison, Rte. 4, Box 1, Louisville, Tenn. 37777
Filed Nov. 28, 1975, Ser. No. 636,028
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



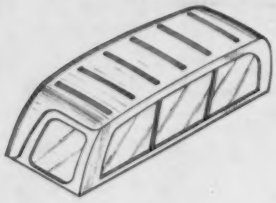
244,265
AIRCRAFT
Waldo Virgil Opfer, San Diego County, Calif., assignor to Teledyne Ryan Aeronautical a Division of Teledyne Industries, Inc., San Diego, Calif.
Filed Aug. 14, 1975, Ser. No. 604,631
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—71



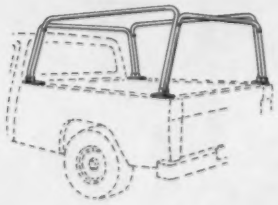
244,266
BICYCLE FRAME
Larry M. Cognata, and Dennis C. Patterson, both of Nashville, Tenn., assignors to The Murray Ohio Manufacturing Company, Brentwood, Tenn.
Filed Nov. 6, 1975, Ser. No. 629,552
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—111



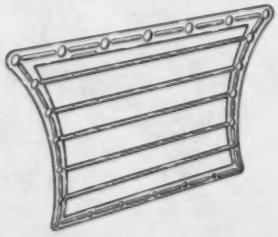
244,267
CAB ENCLOSURE FOR TRUCKS
Lawrence P. Fay, 1304 Lorne St., Regina, Saskatchewan, Canada
Filed Dec. 8, 1975, Ser. No. 638,380
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—156



244,268
PICKUP TRUCK RACK
Roy F. Hinch, 823 College Ave., Greenville, Ill. 62246
Filed Oct. 21, 1975, Ser. No. 624,474
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—157



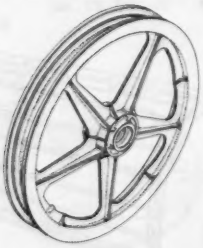
244,269
TRUCK GRILL
Steve Gostovich, Jr., 4180 SW. 98th Ave., Portland, Oreg. 97225
Filed Mar. 26, 1976, Ser. No. 670,644
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—163



244,270
REAR-VIEW MIRROR
Raymond A. McCarroll, 1725 Newcastle, Grosse Pointe Woods, Mich. 48236
Filed Sept. 18, 1975, Ser. No. 614,520
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187

244,271
AUTOMOTIVE REARVIEW MIRROR
John L. Harrison, Wellington, Colo., assignor to Harrison Manufacturing Company, Inc., Wellington, Colo.
Filed Feb. 12, 1976, Ser. No. 657,380
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—187

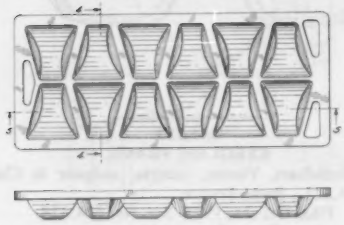
244,272
WHEEL
Charles Joseph Raudman, Jr., 23350 Agramonte, Newhall, Calif. 91321, and Edward Hugo Hoffman, 382 Laguna Terrace, Simi Valley, Calif. 93065
Continuation-in-part of Ser. No. 606,750, Aug. 22, 1975, abandoned. This application June 21, 1976, Ser. No. 698,422
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205



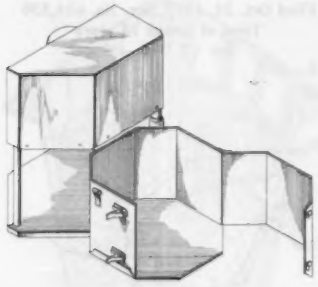
244,273
AUTOMOBILE WHEEL
Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.
Continuation-in-part of Ser. No. 375,311, July 2, 1973, abandoned. This application Aug. 22, 1974, Ser. No. 499,798
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—211

244,274
VACUUM CLEANER NOZZLE
Karl Gunnar Winard, Johanneshov, and Bo Gunnar Mattsson, Sollentuna, both of Sweden, assignors to Kooperativa Forbundet (KF) ekonomisk forening, Stockholm, Sweden
Filed July 11, 1975, Ser. No. 595,317
Claims priority, application Sweden, Jan. 16, 1975, 75106
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—64

244,275
ICE CUBE TRAY
Florian Gurbin, Essex, Canada, assignor to F. Gurbin Engineering & Manufacturing, Essex, Canada
Filed Mar. 31, 1976, Ser. No. 672,452
Term of patent 14 years
Int. Cl. D15—*07*
U.S. Cl. D15—90



244,276
GARBAGE COMPACTOR
Hans Bachmann, Lenzburg, Switzerland, assignor to Soder A.G. Maschinenfabrik, Lenzburg, Switzerland
Filed Jan. 28, 1976, Ser. No. 652,972
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—123

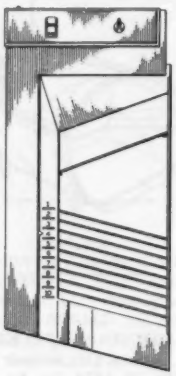


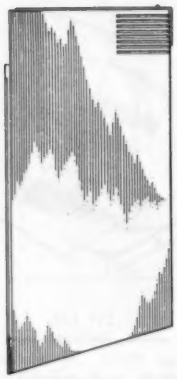
244,277
DUST CATCHER FOR GRINDING OPERATIONS OR THE LIKE
Mesrop Der-Avanessian, 2020 Sunset Blvd., Los Angeles, Calif. 90036
Continuation-in-part of Ser. No. 644,536, Dec. 29, 1975. This application Apr. 2, 1976, Ser. No. 673,281
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—126

244,278
ADJUSTABLE DECKLE
Carl F. Powell, Jr., Atlanta, Ga., assignor to Poly Systems, Inc.
Filed Oct. 28, 1975, Ser. No. 626,189
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—138

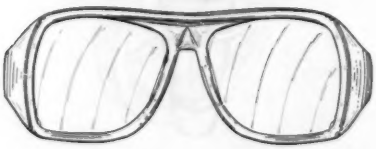
244,279
TOOL HOLDER WITH DOUBLE FLANGE
Warren E. Ponemon, Mill Neck, N.Y., assignor to Autonamerics, Inc., Hauppage, N.Y.
Filed Sept. 24, 1975, Ser. No. 616,190
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—140

244,280
SORTER WITH BIN INDICATOR
Thomas R. Cross, Rochester; Clifford L. George, Macedon, and Jacob W. Patla, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.
Filed Mar. 24, 1975, Ser. No. 561,460
The portion of the term of this patent subsequent to July 13, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—32



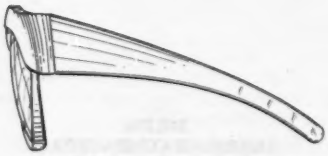


244,281
EYEGLASS FRAME
Elfriede Teufelhart, Vienna, Austria, assignor to Christian Dior, S.A.R.L.
Filed Oct. 21, 1975, Ser. No. 624,325
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



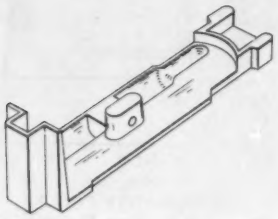
244,282
EYEGLASS FRAME
Elfriede Teufelhart, Vienna, Austria, assignor to Christian Dior, S.A.R.L.
Filed Oct. 21, 1975, Ser. No. 624,327
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,283
EYEGLASS FRAME
Elfriede Teufelhart, Vienna, Austria, assignor to Christian Dior, S.A.R.L., Paris, France
Filed Oct. 21, 1975, Ser. No. 624,328
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



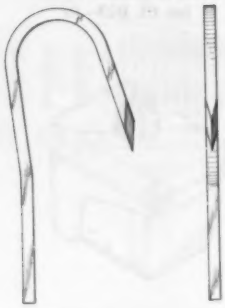
244,284
EYEGLASS FRAME
Elfriede Teufelhart, Vienna, Austria, assignor to Christian Dior, S.A.R.L., Austria
Filed Oct. 21, 1975, Ser. No. 624,330
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

244,285
PUSHER FOLLOWER FOR CARTRIDGE MAGAZINES
Jacob Sofinowski, Baltimore County, Md., assignor to AAI Corporation, Cockeysville, Md.
Filed Dec. 31, 1975, Ser. No. 645,591
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—7

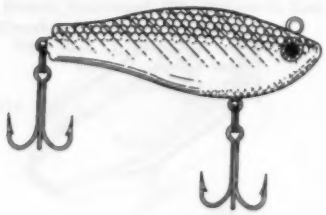


244,286
ELECTRONIC INSECT LANTERN
Sal G. DeYoreo, Andover, Mass., assignor to Automatic Radio Mfg. Co., Inc., Melrose, Mass.
Filed Nov. 3, 1975, Ser. No. 627,958
Term of patent 14 years
Int. Cl. D22—*06*
U.S. Cl. D22—19

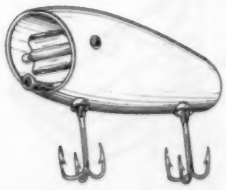
244,287
HOOK FOR FISHING GAFF
Clifford R. Leonard, 27 Church St., East Providence, R.I. 02914
Filed Sept. 8, 1975, Ser. No. 611,448
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D22—22



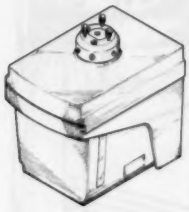
244,288
FISHING LURE
Allen W. Jackson, 1013 Lakemoor Blvd., Rockledge, Fla. 32955
Filed Apr. 26, 1976, Ser. No. 679,977
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



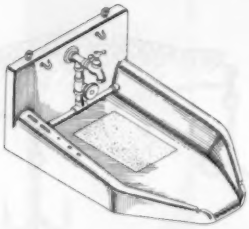
244,289
FISHING LURE
Harry J. Russell, 3009 School St., Rockford, Ill. 61103
Continuation of Ser. No. 433,705, Jan. 16, 1974, abandoned. This application Aug. 14, 1975, Ser. No. 624,761
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



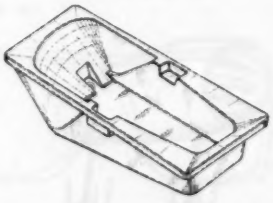
244,290
CONTAINER FOR MACHINE TOOL COOLANT
Shirl R. Alger, 2628 Gallio Ave., Rowland Heights, Calif. 91748; Ronald S. Arnold, 908 W. Oakcrest Ave., Brea, Calif. 92621; James W. Kelso, 1061 Chautauqua Blvd., Pacific Palisades, Calif. 90272, and Manfred Schuler, 4100-C Patrice Road, Newport Beach, Calif. 92663
Filed Feb. 12, 1976, Ser. No. 657,449
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2



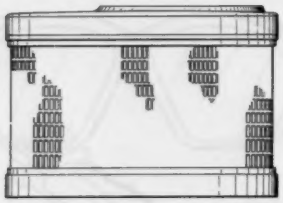
244,291
BASIN
Joseph S. Baker, 2046 Harriett Drive, Tallahassee, Fla. 32303
Filed Jan. 15, 1976, Ser. No. 649,494
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—48



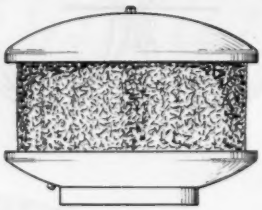
244,292
BATHTUB
Louis H. Ridgeway, R.F.D. 1, Jonesville, S.C. 29353
Filed June 17, 1976, Ser. No. 697,053
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—55



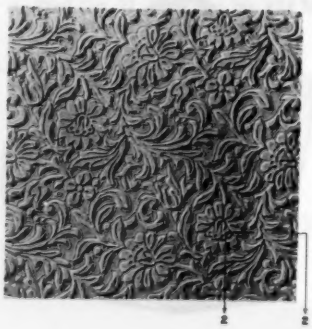
244,293
AIR CONDITIONER CONDENSER COVER
Kenneth Carluccio, Palisades Park, N.J., assignor to Fedders Corporation, Edison, N.J.
Filed May 19, 1975, Ser. No. 578,378
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—139



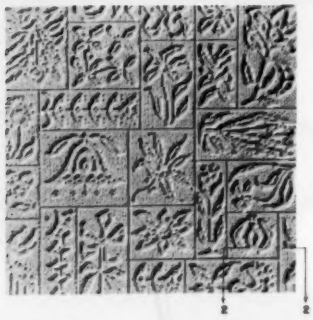
244,294
EVAPORATIVE COOLER
Ronald M. Glasoe, 840 Hamilton, Escondido, Calif. 92025
Filed July 25, 1975, Ser. No. 599,317
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—153



244,295
CEILING TILE
Thomas R. Smith, Glenwood, N.Y., assignor to National Gypsum Company, Buffalo, N.Y.
Filed Aug. 6, 1975, Ser. No. 602,182
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—84



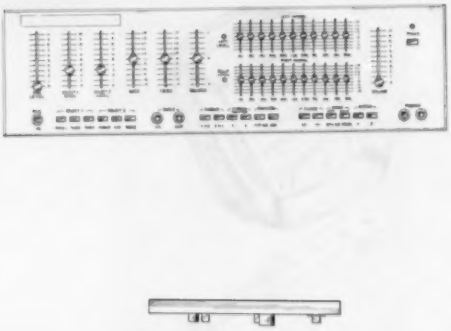
244,296
CEILING TILE
Thomas R. Smith, Glenwood, N.Y., assignor to National Gypsum Company, Buffalo, N.Y.
Filed Aug. 22, 1975, Ser. No. 606,960
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—97



244,297
ELECTRIC PLUG
Edward J. Stropkay, Chesterland, Ohio, assignor to Gould Inc.
Filed Apr. 21, 1975, Ser. No. 569,595
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—28

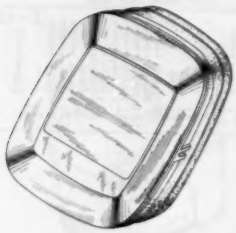
244,298
ELECTRIC PLUG
Edward J. Stropkay, Chesterland, Ohio, assignor to Gould Inc.
Filed Apr. 21, 1975, Ser. No. 569,596
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—28

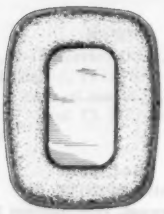
244,299
FRONT PANEL FOR AN AMPLIFIER SYSTEM
John R. Veale, Los Angeles, Calif., assignor to Sultan Products, Incorporated, Inglewood, Calif.
Filed Oct. 2, 1975, Ser. No. 618,798
Term of patent 14 years
Int. Cl. D14—*03, 99*
U.S. Cl. D14—96



244,300
HEADPHONE
Joseph C. Besasie, Shorewood, Wis., assignor to Koss Corporation, Milwaukee, Wis.
Filed June 11, 1976, Ser. No. 694,980
Term of patent 7 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

244,301
HEADPHONE EARPIECE
Joseph C. Besasie, Shorewood, Wis., assignor to Koss Corporation, Milwaukee, Wis.
Filed June 11, 1976, Ser. No. 694,982
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—37

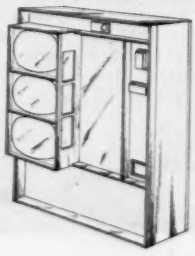




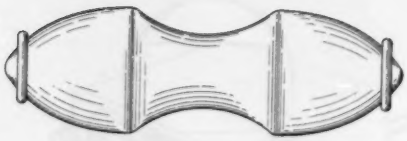
244,302
ASH TRAY FOR AUTOMOBILE
Winford Bradley, 602 N. Pine St., Sebring, Fla. 33870
Filed Mar. 20, 1975, Ser. No. 560,146
Term of patent 14 years
Int. Cl. D27—*03*
U.S. Cl. D27—14

244,303
GOLF PUTTER OR SIMILAR ARTICLE
Nat Cabot, 300 W. Hallandale Beach Blvd., Hallandale, Fla. 33009
Filed June 10, 1975, Ser. No. 585,472
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC

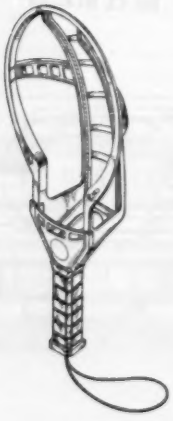
244,304
AMUSEMENT MACHINE FOR REACTION TESTING
James L. Hatch, 342 Paseo de la Playa, Redondo Beach, Calif. 90277, and James W. Hatch, 15 Mustang Road, Rolling Hills, Calif. 90274
Filed July 25, 1975, Ser. No. 599,181
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D34—5 L



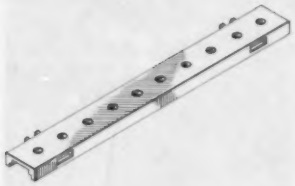
244,305
RESILIENT TOY ARTICLE
Salvatore Lombardi, Jr., Barrington, R.I., assignor to Peggy, Inc., Warren, R.I.
Filed Mar. 8, 1976, Ser. No. 665,160
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 GP



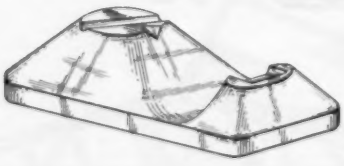
244,306
JAI ALAI RACKET
Jeffery R. Bisch, Manhattan Beach, Calif., assignor to Wham-O Mfg. Co., San Gabriel, Calif.
Filed Dec. 10, 1975, Ser. No. 639,471
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CT



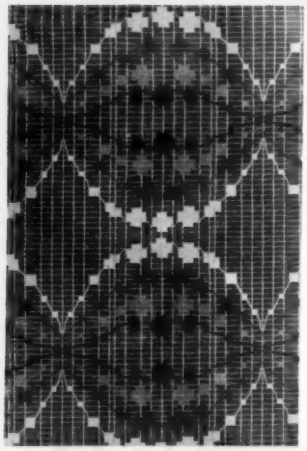
244,307
INTERCONNECTING PIECE FOR AN EDUCATIONAL PEGBOARD
Robert Maddestra, Canton, and David E. Munn, Framingham, both of Mass., assignors to Damon Corporation, Needham Heights, Mass.
Filed July 11, 1975, Ser. No. 595,320
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 GG



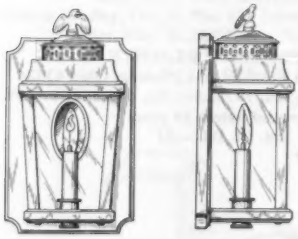
244,308
GAME PROJECTILE LAUNCHER
Carl M. Henry, 1946 Franklin Ave., Toledo, Ohio 43624
Filed Aug. 14, 1975, Ser. No. 604,881
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 PP



244,309
CURTAIN MATERIAL
Peter E. Schroeder, Oberwil bei Brenngarten, Am Falter 8, Lucerne, Switzerland
Filed Mar. 20, 1975, Ser. No. 560,521
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 E

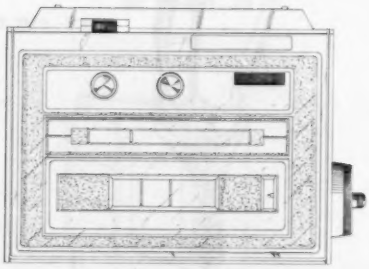


244,310
WALL LAMP
James H. Dunning, Box 5567, Greensboro, N.C. 27403
Filed Nov. 24, 1975, Ser. No. 634,558
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—4 B

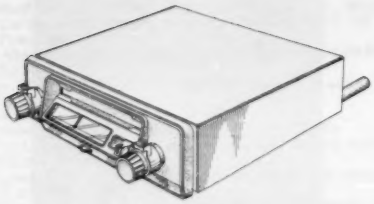


244,311
AUTOMOBILE HEADLIGHT SHIELD
Norton M. Kirsch, Chicago, Ill., assignor to Auto Gard, Inc., Chicago, Ill.
Filed June 16, 1975, Ser. No. 586,868
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 D

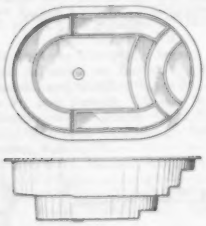
244,312
CLOCK RADIO
John S. Kolwaite, Syracuse, N.Y., assignor to General Electric Company
Filed June 16, 1975, Ser. No. 587,186
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73



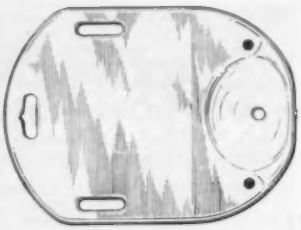
244,313
CAR RADIO
Hiromasa Imado, Suite 101, 15th Bldg., 14 Oimatsu cho, Nishinomiya, Hyogo, Japan
Filed Oct. 6, 1975, Ser. No. 619,610
Claims priority, application Japan, Sept. 5, 1975, 50-36255
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—5



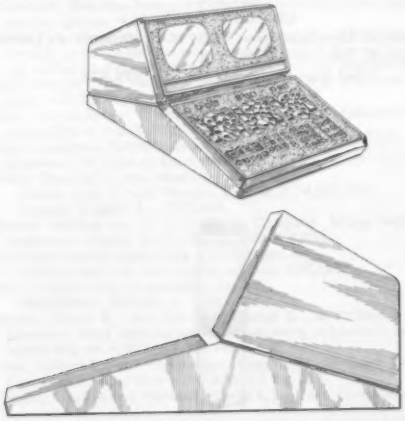
244,314
SPA HYDROTHERAPY POOL
John W. Stangle, 168 W. Avenida De Los Arboles, Thousand Oaks, Calif. 91360
Filed Sept. 17, 1975, Ser. No. 614,258
Term of patent 14 years
Int. Cl. D23—*02;* D24—*02*
U.S. Cl. D24—38



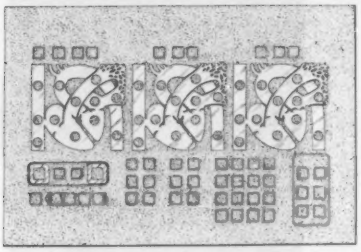
244,315
RESUSCITATION BOARD
Harold R. Havstad, Eagle Point, Oreg., assignor to Hudson Oxygen Therapy Sales Company, Temecula, Calif.
Filed Mar. 3, 1976, Ser. No. 663,251
Term of patent 14 years
Int. Cl. D21—*02;* D24—*02*
U.S. Cl. D24—64



244,316
CARDIAC CATHETERIZATION COMMAND CONSOLE
Donald H. Bodell, Trumbull; Gareth Alexander Mair, Stratford; Mario Francis Rossi, Trumbull, all of Conn., and Jerome A. G. Russell, Minneapolis, Minn., assignors to North American Philips Corporation, New York, N.Y.
Filed Apr. 13, 1976, Ser. No. 676,471
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—1.1

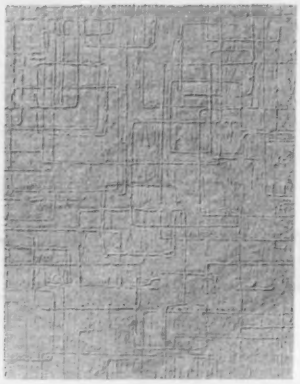


244,317
CARDIAC CATHETERIZATION KEYBOARD OVERLAY
Jerome A. G. Russell, Minneapolis, Minn.; Donald H. Bodell, Trumbull; Gareth Alexander Mair, Stratford, both of Conn., and Mario Francis Rossi, Trumbull, Conn., assignors to North American Philips Corporation, New York, N.Y.
Filed Apr. 13, 1976, Ser. No. 676,472
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—7



244,318
LIPSTICK CASE
John Stewart Drysdale, New York, N.Y., assignor to Helena Rubinstein, Inc., New York, N.Y.
Filed May 21, 1975, Ser. No. 579,478
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—89

244,319
EMBOSSED PLASTIC SHEET MATERIAL
Jared R. Kies, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio
Filed July 7, 1975, Ser. No. 594,148
Term of patent 14 years
Int. Cl. D5—*06*
U.S. Cl. D87—3 G



244,320
EYEGLASS CASE
Larry Cohen, 152 E. 35th St., New York, N.Y. 10016
Filed Jan. 26, 1976, Ser. No. 652,083
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—9

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Babunovic, Momir, 4,022,230.
Bart, Hans U., to Teledyne Industries, Inc. Piezoelectric fuel injector valve. 4,022,166, Cl. 123-32.0JV.
Bartenstein, Michael F., to Vermont Marble Company. Machine for seaming together a lid and a container. 4,022,141, Cl. 113-58.000.
Bartlett, Gordon E.; and Roach, Michael D. Golf greens mower. 4,021,996, Cl. 56-7.000.
Bartolini, Robert Alfred; Burke, William Joseph; and Bloom, Allen, to RCA Corporation. Method for desensitizing recorded organic volume phase holographic recording media. 4,022,618, Cl. 96-27.00H.
Bartolini, Robert Alfred: *See—*
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Batter, John F., Jr., to Polaroid Corporation. Photographic system employing a cassette carrying a processing indicator. 4,023,194, Cl. 354-317.000.
Bauer, Paul R., to Wiltron Company. Technique and apparatus for measuring the value of a capacitance in an electrical circuit such as a telephone communication line. 4,022,990, Cl. 179-175.30F.
Baugh, James C., Jr.: *See—*
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Bauman, Edward W., Jr.; and McLean, Edwin J., to Scott Paper Company. Lift sheet. 4,022,135, Cl. 108-51.300.
Baumgaertner, Heinrich, to Hochtemperatur-Reactorbau GmbH. Nuclear powerplant with closed gas-cooling circuit for production of process heat. 4,022,659, Cl. 176-60.000.
Baumgartner, Henri; and Meier, John, to Fascione, Pietro. Boiler using combustible fluid. 4,022,163, Cl. 122-225.00R.
Bayer Aktiengesellschaft: *See—*
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Kreuder, Hans Joachim; Peltzer, Bernd; Beckers, Johannes; Kremer, Wolfgang; and Kempermann, Theo, 4,022,724.
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Bean, Roland C.; and Bean, Bruce L. Anhydrous ammonia tank carrier for farm tractors. 4,022,331, Cl. 214-1.00R.
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Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., to United States of America, Navy. Gas generating compositions. 4,022,705, Cl. 252-188.30R.
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Beecham Group Limited: *See—*
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Beer, Wolfgang: *See—*
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Benson, Jerrel W. Cryosurgical system. 4,022,215, Cl. 128-303.100.
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Berger, Richard M., to American Filtrona Corporation. Tobacco smoke filter. 4,022,221, Cl. 131-10.500.
Berger, Richard M., to American Filtrona Corporation. Tobacco smoke filter. 4,022,222, Cl. 131-10.500.
Berger, Sonja. Frozen garlic and method of producing the same. 4,022,923, Cl. 426-638.000.
Bergfjord, John Alf; Radler, Richard William; and Millonzi, Richard Phillip, to Xerox Corporation. Polymers of benzanthracene as active matrix materials. 4,022,956, Cl. 526-75.000.
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Berkman, Richard M.; Arnett, James C.; and Cleland, Edward L., to California Institute of Technology. Aseptic fluid transfer system. 4,022,256, Cl. 141-1.000.
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Berwick, Albert Edward; and Miram, George Valentine, to Varian Associates. Dual mode gridded gun. 4,023,061, Cl. 313-349.000.
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Bey, Henry A. Portable security lock. 4,022,503, Cl. 292-264.000.
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Biederman, Gerald Bernard. Method and apparatus for use in detecting faint olfactory stimuli. 4,022,054, Cl. 73-23.000.
Bieringer, Harold F., to Caterpillar Tractor Co. Fluid operated apparatus. 4,022,339, Cl. 214-140.000.
Bins, Cornelis Geerlof, to N.V. Rubberfabriek Vredestein. Process for the vulcanization of innertubes, and innertubes vulcanized by applying said process. 4,022,645, Cl. 156-120.000.
Biological Developments, Inc.: *See—*
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Bioscal GmbH: *See—*
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Biricz, Stefan, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Continuous casting plant. 4,022,268, Cl. 164-282.000.
Bishop, Everett Reece; and Leroux, Marcel Henri, to General Electric Company. Numerical control system having a digitized phase loop. 4,023,085, Cl. 318-608.000.
Bishop, Walton B., to United States of America, Navy. Electronic urn decision device. 4,023,024, Cl. 235-152.000.
Bituminous Coal Research, Inc.: *See—*
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Black, Edgar R.; Montagna, Angelo A.; and Swift, Harold E., to Gulf Research & Development Company. Hydrocarbon conversion process using a Ni and/or CO substituted synthetic aluminosilicate catalyst. 4,022,684, Cl. 208-111.000.
Black, Glen N. Controlled crop drying attachment for combine. 4,021,929, Cl. 34-54.000.
Black, James R.; and Philofsky, Elliott M., to Motorola, Inc. Process for making semiconductor device. 4,022,931, Cl. 427-91.000.
Blahak, Johannes; and Meiners, Hans-Joachim, to Bayer Aktiengesellschaft. Process for the production of polyurethane foams. 4,022,720, Cl. 260-2.5AC.
Blatt, Leland F. Flow control valve. 4,022,113, Cl. 91-443.000.
Bleloch, William, to Electroheat (Proprietary) Limited. Production of alloys of iron. 4,022,612, Cl. 75-12.000.
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Hansen, Elo Harald; and Ruzicka, Jaromir, 4,022,575.
Block, Hans-Dieter; Hendricks, Udo-Winfried; and Walz, Klaus, to Bayer Aktiengesellschaft. Dicarbamic acid diesters containing phosphorus. 4,022,757, Cl. 260-932.000.
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Blount, David H. Process for the production of alkali silicoformic cyanide. 4,022,873, Cl. 423-325.000.
Bludis, Joseph A.; Lyzinski, David; McKinney, Joel D.; Sebulsky, Raynor T.; and Stauffer, Harry C., to Gulf Research & Development Company. Hydrodenitrogenation of shale oil using two catalysts in series reactors. 4,022,682, Cl. 208-89.000.
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Blue Bell, Inc.: *See—*
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Walters, Russell W., 4,022,037.
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Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,022,530.
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Bokemeyer, Reinhard: *See—*
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Bolin, Stephen R., to Raytheon Company. Laser welding high reflectivity metals. 4,023,005, Cl. 219-121.0LM.
Bollmer, Jacob A., to Dayco Corporation. Hand portable device for fastening a holding bar on a printing blanket and method of fastening same. 4,021,909, Cl. 29-432.100.
Bolt, Kenneth D.: *See—*
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Bopp, Robert D.; and Klosterman, David P., to Orscheln Brake Lever Mfg. Company. Locking pin actuator means for a tilt cab vehicle. 4,022,509, Cl. 296-28.00C.
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Bormann, Alan R.; Martino, William L.; and Moench, Jerry D., to Motorola, Inc. Static storage technique for four transistor IGFET memory cell. 4,023,149, Cl. 340-173.00R.
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Boudouris, Angelo, to Eprad Incorporated. Intermittent film drive for motion picture projector. 4,022,525, Cl. 352-187.000.
Bourrez, Jean-Marie; Chemla, C. Nessin; Fressineau, Jean-Louis; and Hubert, Maurice, to Compagnie Internationale pour l'Informatique. Field selection data operating device. 4,023,023, Cl. 235-152.000.
Bove, Fred, to Terrac Company Limited. Composition for plugging blast-furnace tap-hole. 4,022,739, Cl. 260-28.50C.
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Boxer, Steve. Device and processes for alleviation of muscular pain and stiffness, and symptoms of non-muscular ailments. 4,022,189, Cl. 128-1.00R.
Boyer, Jean-Jacques, to Societe Anonyme Secmafer. Off-road vehicle. 4,022,290, Cl. 180-14.00R.
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Allen, John Kenneth; Palmer, Brian Michael; and McGrath, Brian Patrick, 4,022,846.
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Bradshaw, James T., to F & M Systems, Co., a division of Fischbach and Moore, Incorporated. Multielement changeable sign display. 4,021,946, Cl. 40-33.000.
Brandon, Clarence W., to Brandon, Orpha B., a part interest. Methods of use of sonic wave generators and modulators within subsurface fluid containing strata or formations. 4,022,275, Cl. 166-249.000.
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Braun, Edwin Julius; Lane, Michael Stephen; Meise, Henry August, Jr.; and Taylor, George William, to Bell Telephone Laboratories, Incorporated. Telephone switching system having automated call hold facilities. 4,022,983, Cl. 179-18.00B.
Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, to Bodenseewerk Perkin-Elmer & Co. GmbH. Device for atomizing a sample for flameless atomic absorption measurements. 4,022,530, Cl. 356-85.000.
Braunstein, Gerald Paul, to Cincinnati Milacron Inc. Fixed priority interrupt control circuit. 4,023,143, Cl. 340-172.500.
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Breslow, Jeffrey D.; and Jaworski, Eugene, to Marvin Glass & Associates. Game apparatus. 4,022,474, Cl. 273-138.00A.
Breuers, Konrad Karl, to Delco Industries Ltd. Rope oiler. 4,022,295, Cl. 184-15.00R.
Brewer, Lloyd A.; and Moseman, Lynn R., to J. I. Case Company. Control means with a spring lever. 4,022,077, Cl. 74-473.00R.
Brewin, Thomas A.: *See—*
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Brierley, Cuthbert. Eartags. 4,021,952, Cl. 40-301.000.
Brigham, Robert Norman, to Consolidated Foods Corporation. Constant performance vacuum cleaner. 4,021,879, Cl. 15-319.000.
Brink, Robert A.; Ertel, Richard L.; and Thompson, Stephen A., to Gardner-Denver Company. Enclosed compressor unit. 4,022,550, Cl. 417-234.000.
Brinkman, Willem, to Holec, N.V. Electromagnetically actuated pumps. 4,022,174, Cl. 123-139.00E.
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British Steel Corporation: *See—*
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Brock, Gibson E. Self-loading carrier with trailing end bogie. 4,022,342, Cl. 214-392.000.
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Brooks, Ronald Robert, to RCA Corporation. GTO switching circuits. 4,023,049, Cl. 307-252.00C.
Brouwer, Frans, to Stewart-Warner Corporation. Gear drive for an indicating mechanism. 4,022,016, Cl. 58-125.00C.
Brown, Alvin E. Apparatus for determining the arrival time of alternating signals. 4,022,058, Cl. 73-194.00A.
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Brown, Harry W., to Cutler-Hammer, Inc. Plural-circuit progressive switch. 4,022,999, Cl. 200-67.00G.
Brown, John S., to N.P.I. Corporation. Broiler with an endless bar conveyor. 4,023,007, Cl. 219-388.000.
Brown, Robin Charles Armstrong; and Dow, Julian. Imaging systems. 4,023,175, Cl. 343-17.000.
Bruder, Joseph A.; and Staloff, Marcus, to Calspan Corporation. Radar altimeter. 4,023,168, Cl. 343-7.0ED.
Brugerolle, Jean Renaud, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Thermal cycle for the compression of a fluid by the expansion of another fluid. 4,022,030, Cl. 62-30.000.
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Bucher, Robert, to Sulzer Brothers Limited. Jacquard machine having reciprocating griffes and lifting wires. 4,022,251, Cl. 139-59.000.
Bukhman, Aron Borukhovich; Yanushkevich, Igor Lvovich; Kalashnikov, Vadim Dmitrievich; Levitina, Marina Isaakovna; Rozenberg, Jury Borisovich; Elkin, Vladimir Valentinovich; and Ponomareva, Elena Mikhailovna. Automatic radio compass. 4,023,177, Cl. 343-117.00R.
Bulanchuk, William J., to Midland-Ross Corporation. Clamping holder for busbars. 4,022,967, Cl. 174-156.000.
Bulso, Joseph D., Jr.; and Lewers, William R., to Redicon Corporation. Container trimming apparatus. 4,022,089, Cl. 83-124.000.
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Burke, Francis V., to Work Wear Corporation. Disposable hats. 4,021,859, Cl. 2-197.000.
Burke, Robert Virgil, to Litton Systems, Inc. Microwave oven power supply and oscillator therefor. 4,023,004, Cl. 219-10.55B.
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Busse, Ralph; Moore, Hermus C., Jr.; and Welch, Raymond L., to Cabot Corporation. Mast assembly. 4,021,978, Cl. 52-118.000.
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C. H. Anderson and Associates Ltd.: *See—*
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Cabot Corporation: *See—*
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Cadillac Products, Inc.: *See—*
Barnett, Karl F., 4,022,321.
Caggiano, John J. Disposable footwear. 4,021,941, Cl. 36-10.000.

California Institute of Technology: *See—*
Berkman, Richard M.; Arnett, James C.; and Cleland, Edward L., 4,022,256.
Calim, Thomas F. Method for producing frozen confection. 4,022,031, Cl. 62-66.000.
Calkins, William W. Pet house. 4,021,975, Cl. 52-64.000.
Calspan Corporation: *See—*
Bruder, Joseph A.; and Staloff, Marcus, 4,023,168.
Camilleri, Thomas M. Tire wheel for bowling ball return. 4,022,468, Cl. 273-49.000.
Campagna, Edward R.; Hardy, Donald F.; Palmer, Thomas W., III; Daugherty, Barney R.; and Letawa, John R., to Dart Industries Inc. Glassware coating apparatus. 4,022,155, Cl. 118-423.000.
Campbell, Alfred: *See—*
Tinney, Francis John; and Campbell, Alfred, 4,022,759.
Cancro, Lewis P.: *See—*
Vinson, Leonard J.; and Cancro, Lewis P., 4,022,880.
Canevari, Louis T., to Pitney-Bowes, Inc. Series twin leaf spring weighing scale. 4,022,288, Cl. 177-229.000.
Canon Kabushiki Kaisha: *See—*
Tanikoshi, Kinji, 4,023,082.
Canon Seiki Kabushiki Kaisha: *See—*
Tanikoshi, Kinji, 4,023,082.
Canup, Robert E.; and Faist, Clifford H., to Texaco Inc. Controlled spark duration ignition system. 4,022,177, Cl. 123-148.0CB.
Carborundum Company, The: *See—*
Bennett, Albert; and Marin, Glenn R., 4,022,937.
Caristrap Corporation: *See—*
Karass, Thomas J.; Nguyen, Anh D.; and Vegvari, Paul, 4,022,863.
Carlin, Jack M. Delayed release valve for a fire hydrant. 4,022,421, Cl. 251-74.000.
Carling nee Ehrenberg, Elisabeth Charlotte: *See—*
Andersson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Carling nee Ehrenberg, Elisabeth Charlotte, 4,022,758.
Carlsson, Per-Arne; and Darhult, Bengt. Self-inking hand stamp. 4,022,127, Cl. 101-327.000.
Caron, LaVerne Andrew: *See—*
Crall, Frederick William; and Caron, LaVerne Andrew, 4,022,170.
Carrier Corporation: *See—*
Gucwa, Eugene F., Jr.; Bussjager, Rudy C.; and Grantham, Arthur C., 4,022,598.
Carroll, Wayne E. Method for computing and evaluating emergency priority and evacuation routes for high rise buildings, mines and the like. 4,023,146, Cl. 340-172.500.
Carson, Charles F., to Blue Bell, Inc. Tacker guide and method. 4,022,139, Cl. 112-150.000.
Carson, Donald R.; and Holden, Calvin B., to PPG Industries, Inc. Process for preparing finely-divided refractory powders. 4,022,872, Cl. 423-297.000.
Carter-Wallace, Inc.: *See—*
Soldati, Gianluigi; Finkelstein, Paul; Schlichting, David A.; and Oroshnik, William, 4,022,787.
Case, Cecil L., to Hesston Corporation. Sickle assembly. 4,021,999, Cl. 56-298.000.
Case, Cecil L., to Hesston Corporation. Double windrowing method and apparatus. 4,022,005, Cl. 56-372.000.
Casey, Kenneth, to Du Pont of Canada Limited. Process for the manufacture of co-oriented laminated ethylene polymer films. 4,022,646, Cl. 156-164.000.
Castiglia, Ignatius F., to Thermo-Mold Medical Products, Inc. Body support and protection appliance. 4,022,197, Cl. 128-101.000.
Caterpillar Tractor Co.: *See—*
Bieringer, Harold F., 4,022,339.
Davis, Billy J.; Dawson, Harry J.; Mangus, Ervin E.; and Miller, Kenneth J., 4,022,050.
Durgan, Virgil R. C., 4,022,453.
Groth, Steven L., 4,022,439.
Lindquist, John F., 4,022,341.
Piepho, Donald A.; and Knop, Frederick L., Jr., 4,022,536.
Ross, James W., Jr.; and Bricmont, Francis H., 4,022,570.
Cavanna, Anthony John; and Colombo, Edward Armando, to Mobil Oil Corporation. Method for the production of foamed thermoplastic film having improved resiliency and flexibility characteristics. 4,022,858, Cl. 264-51.000.
Cavicchioli, Ugo: *See—*
Migliardi, Gianfranco; and Cavicchioli, Ugo, 4,023,045.
Caye, Emery A. Material spreader for trucks. 4,022,386, Cl. 239-657.000.
Cebuhar, Stanley W. Tamperproof security device for equipment and method of protection. 4,022,036, Cl. 70-58.000.
Celanese Corporation: *See—*
Patella, Ralph F.; and Vona, Joseph A., 4,022,743.
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., to Pfizer Inc. Polycyclic ether antibiotic. 4,022,885, Cl. 424-122.000.
Central Welding Supply Co., Inc.: *See—*
Slavens, Clyde M., 4,022,068.
Centro Sperimentale Metallurgico S.p.A.: *See—*
Palumbo, Luigi; and Colletta, Angelo, 4,022,668.
Cervoni, Peter P.: *See—*
Shroff, James R.; and Cervoni, Peter P., 4,022,783.
Ceseri, Pierluigi, to Autostrade, S.p.A. Electronic traffic control system. 4,023,017, Cl. 235-150.240.
Chachere, Joseph D., to Gulf Research & Development Company. Filtering process. 4,022,675, Cl. 204-188.000.
Chadwick, William H., Jr.: *See—*
Houston, Herbert J.; Bolt, Kenneth D.; Chadwick, William H., Jr.; and Hall, Tracy R., 4,022,431.
Chagawa, Chikashi; and Yoshinouchi, Sumio, to Kabushiki Kaisha Komatsu Seisakusho. Sprocket device for use in a track-type tractor. 4,022,072, Cl. 74-243.00R.
Chapman, Andrew Ernest Schofield. Portable fire alarm. 4,022,148, Cl. 116-106.000.
Chapman, Richard D.; Holmer, Donald A.; Pickett, Oscar A., Jr.; and Saunders, James H., to Monsanto Company. Dimensionally stable 6TA/6IA fibers. 4,022,756, Cl. 260-78.00R.
Chappell, Walter L. Apparatus for generating electricity and power from natural water flow. 4,023,041, Cl. 290-53.000.
Charkey, Allen, to Energy Research Corporation. Zinc electrodes for secondary batteries. 4,022,953, Cl. 429-229.000.
Charnley, John. Femoral prosthesis. 4,021,865, Cl. 3-1.913.
Chase-Shawmut Company, The: *See—*
Knapp, Edward J., Jr., 4,023,133.
Chemie Linz Aktiengesellschaft: *See—*
Rudorfer, Hermann; Wagner, Anton; Prammer, Franz; and Klausner, Friedrich, 4,022,581.
Chemische Fabrik Kalk GmbH: *See—*
Jenkner, Herbert, 4,022,698.
Chemische Werke Huels Aktiengesellschaft: *See—*
Sommer, Neithart; and Nordsiek, Karl-Heinz, 4,022,959.
Chemla, C. Nessin: *See—*
Bourrez, Jean-Marie; Chemla, C. Nessin; Fressineau, Jean-Louis; and Hubert, Maurice, 4,023,023.
Chemotronics International, Inc.: *See—*
Vinton, Clarence S.; and Franklin, Charles H., 4,022,875.
Chevalier, Maurice: *See—*
Escaro, Jacques; and Chevalier, Maurice, 4,022,162.
Chevet, Michel, to Valti Societe Anonyme pour la Fabrication de Tubes Roulements. Plug changing mechanism for use in piercing mills. 4,022,043, Cl. 72-97.000.
Chevron Research Company: *See—*
Dale, John M.; and Ludwig, Allen C., 4,022,857.
Schneider, Ronald Alan, 4,022,837.
Wilkes, John B.; and Wall, Robert G., 4,022,823.
Chicago Lock Co.: *See—*
Mikos, Aloysius J., 4,022,039.
Childress, Ray. Safety shield attachment. 4,022,026, Cl. 61-63.000.
Childs, William V., to Phillips Petroleum Company. Perfluorocarboxylic acids from carboxylic acids and perfluorocarboxylic acid fluorides. 4,022,824, Cl. 260-539.00A.
Chiquet, Louis Francois. Convertible aircraft. 4,02[illegible],403, Cl. 244-46.000.
Chisholm-Ryder Company, Inc.: *See—*
Burton, Charles G., 4,022,001.
Chiu, Tsuen Mu. Safe with hydraulic safety protection. 4,022,137, Cl. 109-44.000.
Chlosta, Wolfgang: *See—*
Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,022,530.
Choate, James Edwin; and Hall, John Robson. Air supported, multiwall, insulated structure and process of producing same. 4,021,972, Cl. 52-2.000.
Christensen, Edward Walter, II: *See—*
Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, 4,023,129.
Christensen, Kenneth K.; and Uncapher, Charles A., to Continental Can Company. Apparatus for cleaning a doctor blade. 4,022,154, Cl. 118-261.000.
Christoffer, Virgil F. Multiple function electrical measuring and indicating apparatus. 4,023,101, Cl. 324-107.000.
Chrysler Corporation: *See—*
Crall, Frederick William; and Caron, LaVerne Andrew, 4,022,170.
Hurst, John W., 4,022,308.
Chu, Mosi: *See—*
Lau, Edward H.; and Chu, Mosi, 4,022,313.
Churas, Algerd C.; MacLagan, Robert T.; and Hemrich, William R., to Sunbeam Corporation. Hair dryer. 4,021,930, Cl. 34-99.000.
Ciba-Geigy AG: *See—*
Garner, Robert; and Dunnenberger, Max, 4,022,802.
Lacoste, Francois Rene; and Warnery, Jean Marc, 4,022,469.
Ciba-Geigy Corporation: *See—*
Gschwend, Heinz Werner, 4,022,800.
Gschwend, Heinz Werner, 4,022,801.
Kormany, Geza; Kabas, Guglielmo; Schlapfer, Hans; and Siegrist, Adolf Emil, 4,022,772.
L'Eplattenier, Francois; Pugin, Andre; and von der Crone, Jost, 4,022,770.
Lohse, Friedrich; and Schreiber, Bruno, 4,022,753.
Vogel, Christian; and Aebi, Rudolf, 4,022,611.
Cincinnati Butchers' Supply Company, The: *See—*
Schmidt, Carl Oscar, Jr., 4,021,883.
Cincinnati Milacron Inc.: *See—*
Braunstein, Gerald Paul, 4,023,143.
Cipriani, Gioacchino: *See—*
Neri, Carlo; and Cipriani, Gioacchino, 4,022,813.
Cities Service Company: *See—*
Prickril, William A., 4,022,729.
Citrin, Paul S., to Indicon Inc. Actuator for a syringe. 4,022,207, Cl. 128-218.00C.

Ciulacu, Paraschiv: *See—*
Gurgui, Constantin; Luca, Vasile; Eckardt, Andrei; and Ciulacu, Paraschiv, 4,022,650.
Claes, Frans Henri: *See—*
Timmerman, Daniel Maurice; Thijs, Victor Jan; De Winter, Walter Frans; Claes, Frans Henri; and Vandenabeele, Hubert, 4,022,622.
Clark Equipment Company: *See—*
Malott, Theodore A., 4,022,078.
Sturtz, Charles Robert, Jr., 4,022,259.
Clark, James R., to Congoleum Corporation. Methods of manufacturing embossed resinous products. 4,022,643, Cl. 156-78.000.
Clarkson, Raymond E.: *See—*
Gilb, Tyrell T.; and Clarkson, Raymond E., 4,022,537.
Clayton & Lambert Manufacturing Co.: *See—*
Lambert, Charles F., Jr., 4,022,335.
Cleland, Edward L.: *See—*
Berkman, Richard M.; Arnett, James C.; and Cleland, Edward L., 4,022,256.
Clement, Robert Alton, to Du Pont de Nemours, E. I., and Company. Molybdenum catalyzed oxidative coupling polymerization of arenes in liquid hydrogen fluoride. 4,022,717, Cl. 260-2.00H.
Clemente, Riccardi: *See—*
Orazio, Svelto; Rinaldo, Cubeddu; Federico, Zagara; Quirino, Mengarelli; and Clemente, Riccardi, 4,022,531.
Clinton, Robert E. Penile prosthetic apparatus. 4,022,196, Cl. 128-79.000.
Clotz, Paul Arthur: *See—*
Rasicci, Vincent Martion; Swanson, Raymond Nicholas; and Clotz, Paul Arthur, 4,022,734.
Cloud, James R., Sr. Zipper operator. 4,022,506, Cl. 294-1.00A.
Coast Catamaran Corporation: *See—*
Alter, Hobart L.; and Hutchinson, Peter L. V., 4,021,874.
Cohen, Jeffrey M.; and Cohen, Marion D. High efficiency solar collector. 4,022,188, Cl. 126-271.000.
Cohen, Marion D.: *See—*
Cohen, Jeffrey M.; and Cohen, Marion D., 4,022,188.
Colchester Lathe Company Limited, The: *See—*
Long, Peter Graham, 4,023,077.
Coles, Albert Edward: *See—*
Cross, Michael Ellison; and Coles, Albert Edward, 4,022,178.
Colgate-Palmolive Company: *See—*
Gerecht, John Fred, 4,022,829.
Colletta, Angelo: *See—*
Palumbo, Luigi; and Colletta, Angelo, 4,022,668.
Colling, Brian; and Fillingham, Raymond Duncan, to Dacoll Engineering Services Limited. Indoor board games. 4,022,465, Cl. 273-1.00E.
Collins, Vincent B.: *See—*
Strathman, Lyle R.; Bolin, Robert A.; Collins, Vincent B.; and Swanson, Ronald L., 4,023,027.
Colma, Libero. Prefabricated structures for buildings. 4,021,976, Cl. 52-79.700.
Colombo, Edward Armando: *See—*
Cavanna, Anthony John; and Colombo, Edward Armando, 4,022,858.
Colt Industries Operating Corporation (Firearms Division): *See—*
Curtis, George Francis, 4,021,955.
Comeaux, Willie George. Apparatus for detecting location of metal cable failure. 4,023,154, Cl. 340-256.000.
Comer, Frederick William, to Griffith Laboratories, Limited, The. Removal of bitter flavor from pea flour. 4,022,919, Cl. 426-511.000.
Commissariat a l'Energie Atomique: *See—*
Gama, Jean-Michel; and Kung, Jean-Pierre, 4,022,658.
Gaouditz, Nicolas; Le Borgne, Edouard; and Mogavero, Robert, 4,022,655.
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Commonwealth Scientific and Industrial Research Organization: *See—*
Morse, Roger Neill; and Davey, Edward Thomas, 4,021,895.
Communication Mfg. Co.: *See—*
O'Dea, Orrin B., 4,022,987.
Compagnie Internationale pour l'Informatique: *See—*
Bourrez, Jean-Marie; Chemla, C. Nessin; Fressineau, Jean-Louis; and Hubert, Maurice, 4,023,023.
Compair Industrial Limited: *See—*
Poole, Eric John; and Morris, Sidney John, 4,022,553.
Congoleum Corporation: *See—*
Clark, James R., 4,022,643.
Conn, John L. Adjustable envelope. 4,022,374, Cl. 229-68.00R.
Connell, Joseph B.; Fillebrown, Stephen M.; Horwitz, Michael J.; and Watson, John C., to Telesciences, Inc. Event monitoring transceiver. 4,022,978, Cl. 179-8.00A.
Connolly, John F.; and Flannery, Robert J., to Standard Oil Company (Indiana). Electrochemical production of 1,4-dihydro aromatic compounds. 4,022,673, Cl. 204-73.00R.
Conrad, Jens; Schnegelberger, Harald; Eckert, Hans-Werner; Saygin, Ferdi; and Koppensteiner, Gunter, to Henkel & Cie G.m.b.H. Antimicrobial use of ω-aminocarboxylic acid amides. 4,022,606, Cl. 71-67.000.
Conradty, C.: *See—*
Koziol, Konrad; Sieberer, Karl-Heinz; and Zenk, Baptist, 4,022,679.
Consolidated Foods Corporation: *See—*
Brigham, Robert Norman, 4,021,879.
Constant, Guy R. Assembly and method for driving and withdrawing disc brake piston. 4,021,904, Cl. 29-263.000.
Continental Can Company: *See—*
Christensen, Kenneth K.; and Uncapher, Charles A., 4,022,154.
Continental Group, Inc., The: *See—*
Khoury, Nick S., 4,022,346.
Continental Oil Company: *See—*
Leach, Bruce E., 4,022,843.
Cook, Robert D.: *See—*
Hirzel, Edgar A.; and Cook, Robert D., 4,022,513.
Cook Testing Co.: *See—*
Marathe, Anil, 4,022,273.
Cook, Thorsten P. Video tape cassette changing apparatus. 4,023,207, Cl. 360-92.000.
Coon, Clifford L., to Koppers Company, Inc. Imidol isomer of N-chloroformamido and its process of preparation. 4,022,825, Cl. 260-543.00A.
Cooper, Barry A.: *See—*
McBride, Donald W.; Glenn, Richard L.; and Cooper, Barry A., 4,022,862.
Cooper, Gerald D.: *See—*
Wojcik, Bruce C.; Herrett, Wilfred H.; Cooper, Gerald D.; Goold, Reed; and Wojcik, Charles W., 4,022,678.
Cooper Laboratories, Inc.: *See—*
Diamond, Julius, 4,022,962.
Copolymer Rubber & Chemical Corporation: *See—*
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Corbin, Christopher L. T.: *See—*
Crissy, Charles F.; and Corbin, Christopher L. T., 4,022,496.
Corcoran, Donald G., to International Telephone and Telegraph Corporation. Real three-dimension visual display arrangement. 4,023,158, Cl. 340-324.00R.
Cordes, Claus: *See—*
Schlichting, Karl; Horn, Peter; Wurmb, Rolf; Cordes, Claus; and Sterzel, Hans-Josef, 4,022,748.
Cornell, Cyrus J. Sawmill apparatus. 4,022,314, Cl. 198-413.000.
Coronelli, Carolina: *See—*
Parenti, Francesco; Coronelli, Carolina; Tamoni, Giorgio; and Lancini, Giancarlo, 4,022,884.
Corrigan, Michael Thomas: *See—*
Spaude, Walter Charles; Wichman, Thomas Duane; Corrigan, Michael Thomas; and Joannon, Jimmie Carl, 4,021,992.
Couch, Terry Lee: *See—*
Stein, Robert George; and Couch, Terry Lee, 4,022,903.
Couch, Vernon Evan. Shopping cart display guide selector. 4,021,953, Cl. 40-308.000.
Coulin, Jean-Paul Rene, to Societe d'Etudes de Machines Thermiques. Device for lubricating the guiding system of an internal combustion engine valve. 4,022,294, Cl. 184-6.900.
Courtenay, John Henry, to Foseco International Limited. Vessels for containing molten metal. 4,022,358, Cl. 222-607.000.
Covey, William B.: *See—*
Teng, Robert N.; and Covey, William B., 4,022,053.
Cowan, Robert L., II: *See—*
Gordon, Gerald M.; and Cowan, Robert L., II, 4,022,662.
Cox, Elward LeRoy. Collapsible bicycle. 4,022,485, Cl. 280-287.000.
Cox, Paul, Jr.: *See—*
Benton, Charles M.; Cox, Paul, Jr.; Sprinkle, Paul M.; and Nowak, Frank John, 4,021,905.
Coxbill, Duane. Milo saver. 4,022,000, Cl. 56-312.000.
CPC International Inc.: *See—*
Idaszak, Leo R., 4,021,927.
Crafts, Harold Springer, to Data General Corporation. MOS pulse-edge detector circuit. 4,023,047, Cl. 307-363.000.
Cragoe, Edward J., Jr.: *See—*
Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,022,794.
Crall, Frederick William; and Caron, LaVerne Andrew, to Chrysler Corporation. Circuit for generating a temperature compensated throttle advance signal having position and rate components. 4,022,170, Cl. 123-117.00R.
Crane Co., Hydro-Aire Division: *See—*
Hirzel, Edgar A.; and Cook, Robert D., 4,022,513.
Crawford, Howard E. Telescopic sight mount. 4,021,954, Cl. 42-1.0ST.
Crawford, LeRoy A.; and McIlwain, Irwin D., to Sperry Rand Corporation. Adjustment cams for removing end play from tying mechanism on a baler. 4,022,121, Cl. 100-29.000.
Creative Technology Corporation: *See—*
Rodriguez, Edward T., 4,023,035.
Cremer, George D.: *See—*
Long, John V.; and Cremer, George D., 4,022,481.
Crepeau, Melvin J., to Harry H. Bell & Sons, Inc. Apparatus for scoring crab claws and the like. 4,021,886, Cl. 17-71.000.
Creston Manufacturing Co., Inc.: *See—*
Henke, Donald L., 4,022,004.
Crissy, Charles F.; and Corbin, Christopher L. T., to Aeroquip Corporation. Frangible diaphragm refrigeration coupling. 4,022,496, Cl. 285-3.000.
Crissy, Charles F.: *See—*
Holmes, Paul M.; Crissy, Charles F.; and Brant, Douglas M., 4,022,499.
Crompton & Knowles Corporation: *See—*
Poterala, Robert J.; and Richards, Marshall C., 4,021,894.
Cross, Michael Ellison; and Coles, Albert Edward. Valves. 4,022,178, Cl. 123-190.00E.
Crouse-Hinds Company: *See—*
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Crow, Morgan LeVon, to Dresser Industries, Inc. Automatic alignment system for earth boring rig. 4,022,284, Cl. 173-2.000.

Crown Zellerbach Corporation: *See*—
Goheen, David W.; and Barton, John S., 4,022,965.

Cucinella, Salvatore; Dozzi, Giovanni; and Mazzei, Alessandro, to Snam Progetti S.p.A. Process for the preparation of poly-N-alkyliminoalanes. 4,022,809, Cl. 260-448.00R.

Culbertson, Harry M.: *See*—
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Cullen, Walter P.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,022,885.

Cummings, Lowell O., to PVO International Inc. Method for coating wet surfaces or surfaces immersed in water. 4,022,946, Cl. 428-413.000.

Curcio, Michael. Roller device. 4,022,393, Cl. 242-55.200.

Currie, Harry A.; and Heathcock, William F., to Texas Instruments Incorporated. Beacon tracking display system. 4,023,176, Cl. 343-113.00R.

Curtis, George Francis, to Colt Industries Operating Corporation (Firearms Division). Firing pin locking device and method. 4,021,955, Cl. 42-70.00F.

Curtis, Michael, to Lever Brothers Company. Production of detergent compositions containing calcium carbonate. 4,022,702, Cl. 252-89.00R.

Cutler-Hammer, Inc.: *See*—
Brown, Harry W., 4,022,999.

Cutler, Norman W., Jr.: *See*—
Augustin, Rolf M., Jr.; and Cutler, Norman W., Jr., 4,023,191.

Cutler, Royal A.: *See*—
Diana, Guy D.; and Cutler, Royal A., 4,022,833.

Cyberex Incorporated: *See*—
Murray, James E.; and Resch, Robert J., 4,023,081.

D.A.B. Industries, Inc.: *See*—
Malinowski, Eugene F., 4,022,298.

D'Achille, Massimo; and Bucci, Mario, to Montedison Fibre S.p.A. Continuous polymerization process in emulsion. 4,022,744, Cl. 260-29.60R.

Dacoll Engineering Services Limited: *See*—
Colling, Brian; and Fillingham, Raymond Duncan, 4,022,465.

da Costa, Nicholas Mario: *See*—
Howes, John Gordon Bernard; Selway, Rupert Aleck; da Costa, Nicholas Mario; and Potter, William Duncan, 4,022,754.

Daido Kiko Co., Ltd.: *See*—
Yonekura, Sukio, 4,022,429.

Daido-Maruta Finishing Co. Ltd.: *See*—
Ichihara, Mamoru, 4,022,574.

Daikin Kogyo Co., Ltd.: *See*—
Yoshimura, Tatsushiro; Suzue, Seisuke; Tominaga, Shigetake; Namba, Mutausuke; and Mizuno, Toshio, 4,022,742.

Dale, John M.; and Ludwig, Allen C., to Chevron Research Company. Production of foamed sulfur compositions. 4,022,857, Cl. 264-42.000.

D'Aloia, Andrew, to American Technical Industries, Inc. Bin for mail sorting apparatus. 4,022,340, Cl. 214-307.000.

Dalton, William O.: *See*—
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Damon Corporation: *See*—
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Danfoss A/S: *See*—
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Danielewicz, Edward J., Jr., to University of Illinois Foundation. Laser output coupler. 4,023,119, Cl. 331-94.50C.

Dardi, Louis E.: *See*—
Freeman, William R., Jr.; and Dardi, Louis E., 4,021,910.

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Carlsson, Per-Arne; and Darhult, Bengt, 4,022,127.

Dart Industries Inc.: *See*—
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Parker, Keith, 4,022,464.
Weet, James H., 4,022,638.

Darwin, William B.; and Livengood, Joseph Michael, to Darwin, William B. Hydroponic system convertible to an open or closed system. 4,021,964, Cl. 47-62.000.

Data General Corporation: *See*—
Crafts, Harold Springer, 4,023,047.

Data Packaging Corporation: *See*—
Lowry, Alan, 4,022,397.

Datatron, Inc.: *See*—
Hanashey, Richard Emil, 4,023,097.

Daugherty, Barney R.: *See*—
Campagna, Edward R.; Hardy, Donald F.; Palmer, Thomas W., III; Daugherty, Barney R.; and Letawa, John R., 4,022,155.

Davey, Edward Thomas: *See*—
Morse, Roger Neill; and Davey, Edward Thomas, 4,021,895.

Davies, Richard E.: *See*—
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Davis, Billy J.; Dawson, Harry J.; Mangus, Ervin E.; and Miller, Kenneth J., to Caterpillar Tractor Co. Method of manufacturing a heat exchanger steel. 4,022,050, Cl. 72-379.000.

Davis, Charles C., to UARCO Incorporated. Burster. 4,022,364, Cl. 225-100.000.

Davis, Devin S.: *See*—
Davis, Leon E., 4,022,245.

Davis, Donald H.; and Mossey, John G., to General Electric Company. Shaft bearing and seals for butterfly valves. 4,022,424, Cl. 251-214.000.

Davis, Frederick, to Robert Parker Research, Inc. Cholesteric liquid crystal water base ink and laminates formed therefrom. 4,022,706, Cl. 252-299.000.

Davis, James R., Jr. Observable workpiece abrading machine. 4,021,969, Cl. 51-135.00R.

Davis, Leon E., to Davis, Devin S., a part interest. Sight check valve. 4,022,245, Cl. 137-559.000.

Davis, William F. Motorcycle frame and suspension and methods of making and using the same. 4,022,484, Cl. 280-284.000.

Dawson, Harry J.: *See*—
Davis, Billy J.; Dawson, Harry J.; Mangus, Ervin E.; and Miller, Kenneth J., 4,022,050.

Dawson, John, to Rototron Corporation. Molding apparatus utilizing planetary gear arrangement. 4,022,564, Cl. 425-430.000.

Dawson, Roy E., to Owens-Illinois, Inc. Apparatus for cooling newly formed glass containers. 4,022,604, Cl. 65-348.000.

Day, Edward A.: *See*—
Kirsch, Jeffrey W.; and Day, Edward A., 4,022,508.

Day, John E.; and La Force, Phil D., to United States of America, Air Force. Nozzle ejection system. 4,022,129, Cl. 102-49.500.

Dayco Corporation: *See*—
Bollmer, Jacob A., 4,021,909.
Wolfe, Jerry D., 4,022,070.

Dayton-Walther Corporation: *See*—
Afanador, Carlos P.; and Fannin, Chester N., 4,022,300.

Dean, Sheldon W., to Swiss Aluminium Ltd. Process for preparation of lithographic printing plates. 4,022,670, Cl. 204-38.00A.

Deaton, Charles U. Illuminator grids and method of forming baffles therefor. 4,021,985, Cl. 52-473.000.

DeBoer, Clarence: *See*—
Bannister, Brian; DeBoer, Clarence; and Renis, Harold E., 4,022,889.

de Bot, Laurentius Antonius Peter Maria: *See*—
Teer, Kees; Janssen, Peter Johannes Michiel; and de Bot, Laurentius Antonius Peter Maria, 4,022,986.

de Cazenove, Hubert E.; Doyen, Daniel; Dussidour, Jacques M.; and Gautier, Jean-Jacques, to Societe Nationale des Poudres et Explosifs. Process for continuous production of trinitrotoluene. 4,022,844, Cl. 260-645.000.

Deeg, Emil W., to American Optical Corporation. Ion exchange-strengthened silicate glass filter for ultraviolet light. 4,022,628, Cl. 106-52.000.

Deepen Enterprises, Inc.: *See*—
Dietrich, Ursula, 4,022,879.

de Gennes, Gerard, to Societe Anonyme Francaise du Ferodo. Friction disc with bonded lining. 4,022,310, Cl. 192-107.00C.

Deike, Robert F., to Foresight Industries. Reusable yielding post supports. 4,021,977, Cl. 52-98.000.

Delaney, Larry R., to Bituminous Coal Research, Inc. Heat detection and alarm system. 4,023,164, Cl. 340-418.000.

Delco Industries Ltd.: *See*—
Breuers, Konrad Karl, 4,022,295.

Delle-Alsthom: *See*—
Dumont, Pierre; and Vigreux, Jacques, 4,022,236.

Deltrol Corporation: *See*—
Donner, Verne P., 4,022,109.

DeLuca, Hector F.: *See*—
Matsunaga, Isao; Ochi, Kiyoshige; Nagano, Hiroyuki; Shindo, Minoru; Ishikawa, Masayuki; Kaneko, Chikara; and DeLuca, Hector F., 4,022,768.

Demilie, Paul, to Solvay & Cie. Process for the fabrication of sodium bicarbonate and boric acid from borosodium ores. 4,022,871, Cl. 423-283.000.

Dengel, Ottmar H.: *See*—
Beckert, Werner F.; Barber, William H.; and Dengel, Ottmar H., 4,022,705.

Denkowski, Walter J.; and Zouzoulas, John, to Philadelphia Gear Corporation. De-clutch mechanism for valve operator. 4,022,309, Cl. 192-48.500.

Dennison Manufacturing Company: *See*—
Keough, Allen H.; and Pitts, Warren R., 4,022,926.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Amino derivatives of pyrido(3,4-b)pyrazine carboxylic acids and esters. 4,022,779, Cl. 260-250.0BC.

de Putter, Warner Jan, to Wafilin B.V. Fibrous tube for membrane filtration with a tearing member. 4,022,249, Cl. 138-178.000.

DeSoto, Inc.: *See*—
Sekmakas, Kazys; and Yates, Robert O., 4,022,737.

Dessau, Ralph M., to Mobil Oil Corporation. Oxidative chemical removal of pyritic sulfur from coal by manganese, vanadium, and cerium oxidants. 4,022,588, Cl. 44-1.00R.

Detaille, Louis J. Device for treating the pulp-canals of a tooth. 4,021,921, Cl. 32-40.00R.

Detroit Tool & Engineering Co.: *See*—
Miner, Earl L., 4,021,877.

Deutsch, Daniel H. Acetylation process for nucleoside compounds. 4,022,963, Cl. 536-23.000.

Deutsch, Leslie J.: *See*—
Deutsch, Ralph; and Deutsch, Leslie J., 4,022,098.

Deutsch, Ralph; and Deutsch, Leslie J. Keyboard switch detect and assignor. 4,022,098, Cl. 84-1.030.

Deutschbein, Otto; Faulstich, Marga; Neuroth, Norbert; and Jahn, Walter, to Jenaer Glaswerk Schott & Gen. Athermal laser glass. 4,022,707, Cl. 252-301.60P.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*— Laufer, Siegmar; and Roy, Waldemar, 4,022,152.

Develop KG/Dr. Eisbein and Co.: *See*— Moser, Kurt; Weigele, Reinhold; and Pfeil, Wolfgang, 4,022,122.

Devlin, Daniel H. Holster for a concealed weapon. 4,022,361, Cl. 224-2.00B.

De Winter, Walter Frans: *See*— Timmerman, Daniel Maurice; Thijs, Victor Jan; De Winter, Walter Frans; Claes, Frans Henri; and Vandenabeele, Hubert, 4,022,622.

Dhein, Rolf: *See*— Zabrocki, Karl; Dhein, Rolf; Kiichenmeister, Rolf; and Beer, Wolfgang, 4,022,726.

Diagnostic Data, Inc.: *See*— Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,022,877.
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,022,888.
Saifer, Mark G.; Williams, Lewis D.; and Huber, Wolfgang, 4,022,224.

Diamond, Julius, to Cooper Laboratories, Inc. Carbamylguanidine antimicrobial compounds. 4,022,962, Cl. 536-18.000.

Diana, Guy D.; and Cutler, Royal A., to Sterling Drug Inc. N,N'-bridged-bis[2-alkyl-2-hydroxyethylamines]. 4,022,833, Cl. 260-563.00R.

Didier-Werke AG: *See*— Klein, Walter; and Nobis, Heinrich, 4,022,572.
Langenfeld, Wilhelm; and Stelzner, Klaus, 4,022,445.

Diebold, Incorporated: *See*— Kinker, Donald E., 4,023,013.

DIEHL: *See*— Politzer, Anton; and Machmer, Wilhelm, 4,022,104.

Diessel GmbH & Co.: *See*— Kaune, Manfred, 4,022,066.

Dietrich, Ursula, to Deepen Enterprises, Inc. Oral hygiene product for animals. 4,022,879, Cl. 424-49.000.

Diggs, Richard E. Rebreathing cap for skin divers in combination with floating snorkel attachment. 4,022,201, Cl. 128-145.00A.

Digital Electronic Automation: *See*— Migliardi, Gianfranco; and Cavicchioli, Ugo, 4,023,045.

Dilg, Walter Cabble, to Dresser Industries, Inc. Draft rigging for railway cars. 4,022,329, Cl. 213-67.00R.

Dillard, George M., to United States of America, Navy. Method and apparatus for computing the discrete Fourier transform recursively. 4,023,028, Cl. 235-156.000.

Distler, Harry: *See*— Schlecht, Helmut; Distler, Harry; and Hartert, Erwin, 4,022,815.

Dobritz, Gunter, to Dragerwerk Aktiengesellschaft. Method and apparatus for mixing two gases in a predetermined proportion. 4,022,234, Cl. 137-7.000.

Dodd, Thomas E.; and Putt, James B., to Bendix Corporation, The. Bracket for a brake pedal. 4,022,081, Cl. 74-512.000.

Doherty, Norman R.; and Doherty, Richard F. Electrically actuated punch press. 4,022,090, Cl. 83-162.000.

Doherty, Richard F.: *See*— Doherty, Norman R.; and Doherty, Richard F., 4,022,090.

Dolle, Francois: *See*— Berrie, Yves; Sebire, Claude; and Dolle, Francois, 4,022,307.

Domke, Klaus: *See*— Kohnlein, Rolf; Domke, Klaus; Bandle, Walter; and Schottle, Helmut, 4,022,373.

Donner, Verne P., to Deltrol Corporation. Automatic directional control valve. 4,022,109, Cl. 91-356.000.

Donovan, John C.: *See*— Krishnaiyer, Ramesh; Donovan, John C.; and Esser, Frank J., 4,023,163.

Doornbos, Tamme; and van den Ouweland, Godefridus Antonius Maria, to Lever Brothers Company. Flavoring with Amadori compounds. 4,022,920, Cl. 426-533.000.

Dorman Smith Switchgear Limited: *See*— Kidd, Alan Lister; Eaves, Douglas; and Walmsley, Keith, 4,023,132.

Dornier System GmbH: *See*— Pimiskern, Klaus; and Herbert, Werner, 4,022,008.

Dove, Arthur I.: *See*— Freakes, Anthony; Ventz, George A.; and Dove, Arthur I., 4,022,332.

Dover Corporation: *See*— Murray, Robert L.; Leininger, Donald L.; and Polson, Charles L., 4,022,235.

Dow Chemical Company, The: *See*— Routson, Willis G., 4,022,277.
Smith, Hubert Stacy, Jr., 4,022,644.

Dow, Julian: *See*— Brown, Robin Charles Armstrong; and Dow, Julian, 4,023,175.

Dowa Co., Ltd: *See*— Miyahara, Kingo, 4,022,567.

Doyen, Daniel: *See*— de Cazenove, Hubert E.; Doyen, Daniel; Dussidour, Jacques M.; and Gautier, Jean-Jacques, 4,022,844.

Doyle, Martin; and Smith, Stephen Collyer, to Imperial Chemical Industries Limited. Process for the manufacture of indole derivatives. 4,022,780, Cl. 260-256.40Q.

Dozzi, Giovanni: *See*— Cucinella, Salvatore; Dozzi, Giovanni; and Mazzei, Alessandro, 4,022,809.

Dragerwerk Aktiengesellschaft: *See*— Dobritz, Gunter, 4,022,234.

Drahtwarenfabrik Drahtzug Stein KG: *See*— Stein, Rudolf; and Schmitt, Werner, 4,022,391.

Drees, Jan M.; Gravley, Arthur D.; Palachek, Charles V.; and Spencer, James L., to Textron, Inc. Helicopter rotor blade. 4,022,546, Cl. 416-226.000.

Dreher, Karl D.; and Sydansk, Robert D., to Marathon Oil Company. Method of selecting oil recovery fluids using nuclear magnetic resonance measurements. 4,022,276, Cl. 166-250.000.

Dresser Industries, Inc.: *See*— Crow, Morgan LeVon, 4,022,284.
Dilg, Walter Cabble, 4,022,329.
Jett, Marion Barney, 4,022,274.
Read, Norman Weldon, 4,022,426.
Read, Norman Weldon, 4,022,427.

Driver, W. B. Formation conditioning process and system. 4,022,279, Cl. 166-271.000.

Drobnik, Stefan, to Gesellschaft fur Kernforschung m.b.H. Method of preparation for storage of liquids used in the reprocessing of spent nuclear fissile and/or fertile materials. 4,022,708, Cl. 252-301.10W.

Drostholm, Frede Hilmar; Petersen, Kaj Ditlev Frederik; and Raabo, Ulf, to Drostholm, Frede Hilmar. Equipment for cleaning solvents. 4,022,669, Cl. 202-160.000.

Du Pont of Canada Limited: *See*— Casey, Kenneth, 4,022,646.

Ducret, Lucian C.: *See*— Marshall, Hamilton W., Jr.; Ducret, Lucian C.; and Atwood, John G., 4,022,240.

Duerdoth, Winston Theodore; Brown, Christopher Anthony; Miller, Michael Robert; and Potter, Arthur Robin, to Post Office, The. Time division multiplex signal processor. 4,023,145, Cl. 340-172.500.

Dumont, Pierre; and Vigreux, Jacques, to Delle-Alsthom. Safety device for a compressed gas tank. 4,022,236, Cl. 137-70.000.

Duncker, Bodo Kurt Adolf; and Eberstein, Bo Soren Tage, to Telefonaktiebolaget L M Ericsson. Broad band amplifier having negative feedback and a controllable amplification factor. 4,023,112, Cl. 330-29.000.

Dunham Associates, Inc.: *See*— Reuter, William L., 4,023,075.

Dunlop Australia Limited: *See*— McDowall, William Leslie, 4,022,951.

Dunnenberger, Max: *See*— Garner, Robert; and Dunnenberger, Max, 4,022,802.

Dupaco Incorporated: *See*— Rowean, Donald R., 4,022,217.

Du Pont de Nemours, E. I., and Company: *See*— Clement, Robert Alton, 4,022,717.
Sam, Donnie Joe; and Wuonola, Mark A., 4,022,777.

Dupre, Herman K. Pole guard. 4,022,452, Cl. 267-140.000.

Durad Machine Company Ltd.: *See*— Rooney, Sidney C., 4,022,366.

Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, to Smith Kline & French Laboratories Limited. Certain thiazole, isothiazole, oxazole, and isoxazole compounds. 4,022,797, Cl. 260-302.00R.

Durgan, Virgil R. C., to Caterpillar Tractor Co. Clamp for engine head service test bench. 4,022,453, Cl. 269-71.000.

Durney, David John, to Burroughs Corporation. Dual in-line chip extractor-exchanger apparatus. 4,022,370, Cl. 228-5.100.

Durr, Arthur: *See*— Slavik, Valter; Ghirlanda, Hieronimus; Ritter, Helmut; and Durr, Arthur, 4,022,389.

Durston, John Graham; and Hind, John Richard, to United Kingdom Atomic Energy Authority. Suspended nuclear reactor containments with reduced thermal stress. 4,022,656, Cl. 176-38.000.

Durussel, Philippe, to Saint-Gobain Industries. Terminal connection for electric heaters for vehicle windows. 4,023,008, Cl. 219-522.000.

Dussidour, Jacques M.: *See*— de Cazenove, Hubert E.; Doyen, Daniel; Dussidour, Jacques M.; and Gautier, Jean-Jacques, 4,022,844.

Dwinell, Davis B., to American Flange & Manufacturing Co., Inc. Retractable pouring spout closure. 4,022,357, Cl. 222-537.000.

Dyer, Michael Philip: *See*— Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, 4,022,980.

Dykinga, Richard J.: *See*— Arthur, Ronald H.; and Dykinga, Richard J., 4,023,003.

E. R. Squibb & Sons, Inc.: *See*— Denzel, Theodor; and Hoehn, Hans, 4,022,779.
Hauck, Frederic Peter; Reid, Joyce; and Kane, Vinayak V., 4,022,788.
Narayanan, Venkatachala L.; Jacobs, Glenn Anthony; and Haugwitz, Rudiger D., 4,022,781.
Narayanan, Venkatachala L.; Gadebusch, Hans H.; and Haugwitz, Rudiger D., 4,022,901.
Sowinski, Francis Alexander; and Vogt, B. Richard, 4,022,774.
Treuner, Uwe D., 4,022,782.
Wade, Peter C.; and Vogt, B. Richard, 4,022,765.
Yale, Harry L.; and Bristol, James A., 4,022,790.
Yale, Harry Louis; and Sheehan, John T., 4,022,897.

Earing, Mason H., to General Electric Company. Modified asphaltite potting composition. 4,022,635, Cl. 106-280.000.

Earnheart, Thomas W.: *See—*
Wilson, Bobby L.; and Earnheart, Thomas W., 4,022,599.
Eastman Kodak Company: *See—*
Barr, Charles Robert; and Williams, John Vincent, 4,022,616.
Hamblen, David P., 4,022,855.
Harvey, Donald Malcolm, 4,023,068.
McGuckin, Hugh G., 4,022,617.
Morie, Gerald P.; and Sloan, Cephas H., 4,022,740.
Newland, Gordon C.; Irick, Gether, Jr.; and Larkins, Thomas H., Jr., 4,022,632.
Simon, Horst; and Bethmann, Heinz G., 4,023,192.
Thomas, William A., Jr.; and Baugh, James C., Jr., 4,022,392.
Trotter, Jimmy R.; and Petke, Frederick D., 4,022,728.
Eaves, Douglas: *See—*
Kidd, Alan Lister; Eaves, Douglas; and Walmsley, Keith, 4,023,132.
Ebersole, George D.: *See—*
Alquist, Henry E.; and Ebersole, George D., 4,022,589.
Eberstein, Bo Soren Tage: *See—*
Duncker, Bodo Kurt Adolf; and Eberstein, Bo Soren Tage, 4,023,112.
Eckardt, Andrei: *See—*
Gurgui, Constantin; Luca, Vasile; Eckardt, Andrei; and Ciulacu, Paraschiv, 4,022,650.
Eckert, Hans-Werner: *See—*
Conrad, Jens; Schnegelberger, Harald; Eckert, Hans-Werner; Saygin, Ferdi; and Koppensteiner, Gunter, 4,022,606.
Eckert, Konrad; Steiner, Josef; Zeilinger, Klaus; and Eidtmann, Helmut, to Robert Bosch G.m.b.H. Fuel injection system for successively introducing multiple fuel quantities in an engine cylinder. 4,022,165, Cl. 123-32.00G.
Eckert, Ronald P., to Amity Leather Products Company. Display case for small articles. 4,022,517, Cl. 312-257.00R.
Edeus, James A.; and Johnston, James R., to National Manufacturing Company. Metal frame construction. 4,021,988, Cl. 52-656.000.
Edge, Gordon Malcolm: *See—*
Ridler, Keith Douglas; Edge, Gordon Malcolm; and Whelan, Robert Charles, 4,023,130.
Edwards, Robert B., to Nibco, Inc. Frost proof sillcock. 4,022,243, Cl. 137-360.000.
Edwards, Wayland C., to Varo, Inc. Camouflage disrupter frame. 4,021,974, Cl. 52-63.000.
Egger, Charlotte. Basket with foldable legs. 4,022,414, Cl. 248-150.000.
Eichenhofer, Josef; and Schubert, Karl, to Urban Transportation Development Corporation Ltd. Hoist mechanism for use in a vehicle such as a bus. 4,022,337, Cl. 214-75.00R.
Eidtmann, Helmut: *See—*
Eckert, Konrad; Steiner, Josef; Zeilinger, Klaus; and Eidtmann, Helmut, 4,022,165.
Eier, Franz: *See—*
Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,022,530.
Eisai Co., Ltd.: *See—*
Kawamura, Tamio; Kato, Satoru; Ikeda, Yasunori; and Kuwana, Noriaki, 4,022,664.
Electroheat (Proprietary) Limited: *See—*
Bleloch, William, 4,022,612.
Electrohome Limited: *See—*
Fichtner, Roland H., 4,023,074.
Elias, Jack D., to United States of America, Air Force. Debris catcher for thrust termination ports. 4,022,020, Cl. 60-263.000.
Eliassen, Gunnar Thure. Device for carrying and storing bottles. 4,022,363, Cl. 224-45.0AA.
Elkin, Vladimir Valentinovich: *See—*
Bukhman, Aron Borukhovich; Yanushkevich, Igor Lvovich; Kalashnikov, Vadim Dmitrievich; Levitina, Marina Isaakovna; Rozenberg, Jury Borisovich; Elkin, Vladimir Valentinovich; and Ponomareva, Elena Mikhailovna, 4,023,177.
Elliott, Curtis Homer, Jr., to W. R. Grace & Co. Silica hydrosol bound cracking catalysts. 4,022,714, Cl. 252-455.00Z.
Elmer's Weights, Inc.: *See—*
Scott, George T., Jr., 4,022,463.
Ely, Hollis, to Hammel, Joan A.; and Hammel, Richard J., part interest to each. Germicidal solutions and methods for preserving and purifying milk, other beverages, foods, water and sewage effluent. 4,022,882, Cl. 424-80.000.
Emerson Electric Co.: *See—*
Plasko, Emil Robert, 4,023,072.
Emerson, Ralph Waldo; and Shattuck, John R., to Plasmine Corporation, The. Ammonia-containing sizing compositions. 4,022,634, Cl. 106-218.000.
EMI Limited: *See—*
Lee, Cyril Arthur, 4,023,204.
Emmett, John Colin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,022,797.
Endres, Dan D.: *See—*
Timmons, Terry K.; and Endres, Dan D., 4,022,211.
Energy Research Corporation: *See—*
Charkey, Allen, 4,022,953.
Engdahl, Arnold Bernard, Jr. Surface cleaning device. 4,022,382, Cl. 239-287.000.
Engelhardt, Bernard H. Marking apparatus. 4,021,876, Cl. 15-3.000.
Engineering Systems Corporation: *See—*
Miller, Albert J., 4,022,038.
Miller, Albert J., 4,023,157.
Engstrom, Hans-Erik Rye; and Pettersson, Bengt Edvard, to Sunds Aktiebolag. Countercurrently bleaching high consistency cellulose pulp with oxygen. 4,022,654, Cl. 162-19.000.
Ensink, Tom; and Zonderman, Rieks, to Hoogovens Ijmuiden BV. Electrically driven apparatus for operating a railway. 4,022,409, Cl. 246-218.000.
Enso-Gutzeit Osakeyhtio: *See—*
Kostiainen, Aatos; Paakkinen, Ilmari; and Rantasuo, Paavo, 4,022,231.
Entoleter, Inc.: *See—*
Kuechler, William L., 4,022,749.
Envirotech Corporation: *See—*
Pankuch, Peter Jerome, 4,022,697.
Eprad Incorporated: *See—*
Boudouris, Angelo, 4,022,525.
Erb, Edward R.; and Faust, Kenneth J., to GAF Corporation. Sheet type covering material with metallic luster and process for making same. 4,022,943, Cl. 428-159.000.
Eremity, Frank: *See—*
Arway, George W.; and Eremity, Frank, 4,023,182.
Erika, Inc.: *See—*
Janneck, Howard A., 4,022,692.
Eriksson, Bertil Torbjorn: *See—*
Blomqvist, Ake Hugo Petrus; and Eriksson, Bertil Torbjorn, 4,022,132.
Eriksson, Hans Erik; and Florvall, Gosta Lennart, to Astra Lakemedel Aktiebolag. Benzylidene hydrazino-1,2,4-triazoles, pharmaceuticals therewith, and method of use. 4,022,905, Cl. 424-269.000.
Ertel, Richard L.: *See—*
Brink, Robert A.; Ertel, Richard L.; and Thompson, Stephen A., 4,022,550.
Escaro, Jacques; and Chevalier, Maurice, to Societe Generale de Fonderie. Boiler having a separable furnace and heat exchanger. 4,022,162, Cl. 122-182.00T.
Espy, Ronald Harry, to Armco Steel Corporation. Austenitic chromium-nickel-copper stainless steel and articles. 4,022,586, Cl. 75-125.000.
Esser, Frank J.: *See—*
Krishnaiyer, Ramesh; Donovan, John C.; and Esser, Frank J., 4,023,163.
Essiembre, Gilbert. Heat distribution system for snowmobile. 4,022,378, Cl. 237-12.30A.
Estan Manufacturing Company: *See—*
Haines, Walter E., 4,021,924.
Esterline, Theodore C., to Mafix, Inc. Work holding device. 4,022,156, Cl. 118-504.000.
Estorff, Eckart v., to Stahlwerke Bruninghaus GmbH. Leaf spring. 4,022,449, Cl. 267-48.000.
Ethyl Corporation: *See—*
Valdo, Alex R., 4,022,614.
Woods, Edward G.; Shepherd, Lawrence H., Jr.; and Breidenbach, Eric P., 4,022,816.
Etingov, Evgeny Davidovich; Bashkovich, Alexandr Pavlovich; Kulbakh, Valter Osvaldovich; Raigorodskaya, Valentina Yakovlevna; Popova, Inessa Vladimirovna; Alexeeva, Ljudmila Evgenievna; Nyn, Vladimir Semenovich; and Lokhina, Nadezhda Dmitrievna. Method of recovering mycoheptin. 4,022,886, Cl. 424-123.000.
Ettel, Godwin, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Method and apparatus for adjusting a fuze after firing a projectile from a weapon. 4,022,102, Cl. 89-6.500.
Ettenberg, Michael: *See—*
Kressel, Henry; and Ettenberg, Michael, 4,023,062.
Etter, Peter; and Faust, Werner, to BBC Brown Boveri & Company Limited. Rectifier switch with series-connected thyristors. 4,023,051, Cl. 307-305.000.
Evans Products Company: *See—*
Krokos, Raymond M., 4,022,134.
Everbrite Electric Signs, Inc.: *See—*
Trame, Charles E., 4,021,944.
Ewart, James M.; Anderson, Clay H.; and St. Jean, Gerard, to C. H. Anderson and Associates Ltd. Universal coupling. 4,022,410, Cl. 248-2.000.
Explosive Metal Working Holland B.V.: *See—*
Zondag, Nicolaas Abraham, 4,021,907.
Exxon Research and Engineering Company: *See—*
Booth, David Andrew; Busby, William James; and Loree, Jean Paul, 4,022,850.
Johnson, Burnett H., 4,022,751.
Maa, Peter S., 4,022,680.
Vandling, John M., 4,022,970.
F. L. Smidth & Co.: *See—*
Meedom, Halvor, 4,022,568.
F & M Systems, Co., a division of Fischbach and Moore, Incorporated: *See—*
Bradshaw, James T., 4,021,946.
Fa. Zahnraederfabrik Renk AG: *See—*
Pollak-Banda, Erich; and John, Erich, 4,022,083.
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, to Warner-Lambert Company. 2,3-Dihydro-N-(5-methyl-3-isoxazolyl)-3-oxo-1,2-benzothiazole-2-acetamide 1,1-dioxide. 4,022,796, Cl. 260-301.000.
Fabian, Fritz: *See—*
Frost, Henry Francis; Fabian, Fritz; Sharpe, Christopher James; and Jones, William Arthur, 4,022,806.

Failla, Stephen J.: *See—*
Barrett, Edward E.; and Failla, Stephen J., 4,022,325.

Fainberg, Samuel M.; and Perez, Porfirio F. Stable solution of benzthiazide (3-[benzythiol methyl]-6-chloro-2H-1,2,4-benzothiadiazine-7-sulfonamide 1,1-dioxide) suitable for parenteral administration and process of preparation. 4,022,894, Cl. 424-246.000.

Fairchild Camera and Instrument Corporation: *See—*
Alfke, Peter H.; Alford, Charles H.; and Breeze, Eric G., 4,023,116.

Faist, Clifford H.: *See—*
Canup, Robert E.; and Faist, Clifford H., 4,022,177.

Falk, Morris, to Fort Lock Corporation. Tubular key cutting machine. 4,022,107, Cl. 90-13.050.

Fannin, Chester N.: *See—*
Afanador, Carlos P.; and Fannin, Chester N., 4,022,300.

Farago, Frank John; Retallack, Dale Gordon; and Sood, Raman Radha, to Alcan Research and Development Limited. Calcination of coke. 4,022,569, Cl. 432-14.000.

Farber, Sheldon, to NCR Corporation. Aminophenyl lactone compounds containing an ethyleno group. 4,022,771, Cl. 260-240.00D.

Farrar, Grover L.; and Storms, Phillip W., to Marathon Oil Company. Heptachloro-alpha-naphthoyl chloride. 4,022,827, Cl. 260-544.00B.

Fascione, Pietro: *See—*
Baumgartner, Henri; and Meier, John, 4,022,163.

Fassler, Werner A., to Sybron Corporation. Film processor. 4,023,190, Cl. 354-319.000.

Faulkner, Kenneth F., to Infrared Surveys, Incorporated. Infrared thermography for determining equipment temperatures in oil well fires. 4,023,201, Cl. 358-113.000.

Faulstich, Marga: *See—*
Deutschbein, Otto; Faulstich, Marga; Neuroth, Norbert; and Jahn, Walter, 4,022,707.

Faust, Kenneth J.: *See—*
Erb, Edward R.; and Faust, Kenneth J., 4,022,943.

Faust, Werner: *See—*
Etter, Peter; and Faust, Werner, 4,023,051.

Federico, Zagara: *See—*
Orazio, Svelto; Rinaldo, Cubeddu; Federico, Zagara; Quirino, Mengarelli; and Clemente, Riccardi, 4,022,531.

Fedorov, Mikhail Ivanovich: *See—*
Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich, 4,022,048.

Feit, Eugene David; and Thompson, Larry Flack, to Bell Telephone Laboratories, Incorporated. Protective coatings for a magnetic tape sensor. 4,023,208, Cl. 360-122.000.

Felder, Donald Wayne; Felder, Ralph; and Monroe, Orville. Sucker rod adjustment tool. 4,022,430, Cl. 254-106.000.

Felder, Ralph: *See—*
Felder, Donald Wayne; Felder, Ralph; and Monroe, Orville, 4,022,430.

Feldman, Devora. Metric unit conversion aid. 4,021,923, Cl. 33-1.00B.

Felten & Guilleaume Carlswerk AG: *See—*
Gladenbeck, Jurgen; and Muller, Gerald, 4,022,010.

Feng, Bai Cwo, to International Business Machines Corporation. Resist reflow method for making submicron patterned resist masks. 4,022,932, Cl. 427-93.000.

Ferranti, Limited: *See—*
McKinlay, William Hall; and Tait, Robert Allan Reid, 4,022,969.
Rowe, Barry; and Rymer, Harold Frank, 4,023,025.

Ferro, Berkeley Michael; Spratling, Rodney Edwin; and Walker, Aubrey Douglas, to Post Office, The. Phosphorescent materials. 4,022,709, Cl. 252-301.350.

Fetty, Walter W. Method of preventing the spread and control of mastitis. 4,022,199, Cl. 128-132.00R.

Fiat-Allis Construction Machinery, Inc.: *See—*
Rockwell, Harvey W., 4,022,282.

Fichtner, Roland H., to Electrohome Limited. Loudspeaker protection network. 4,023,074, Cl. 361-88.000.

Fillebrown, Stephen M.: *See—*
Connell, Joseph B.; Fillebrown, Stephen M.; Horwitz, Michael J.; and Watson, John C., 4,022,978.

Fillingham, Raymond Duncan: *See—*
Colling, Brian; and Fillingham, Raymond Duncan, 4,022,465.

Filter Specialists, Inc.: *See—*
Morgan, Howard William, Jr., 4,022,693.

Fingeroot, Max, to American Motors Corporation. Manifold heat exchanger. 4,022,172, Cl. 123-122.0AC.

Finkelstein, Paul: *See—*
Soldati, Gianluigi; Finkelstein, Paul; Schlichting, David A.; and Oroshnik, William, 4,022,787.

Fioretto, Mauro, to Montan - Castell A.G. Method of producing shaped concrete blocks for hydraulics. 4,022,859, Cl. 264-69.000.

Firester, Arthur Herbert, to RCA Corporation. Laser alignment apparatus and method with an alignment mirror. 4,022,533, Cl. 356-153.000.

Fischer, Kenneth J. Distance indicating mirror device. 4,023,029, Cl. 240-4.200.

Fishman, Boris Isaakovich: *See—*
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.

Fishman, Morris L.: *See—*
Alvarez, Manuel; and Fishman, Morris L., 4,022,672.

Fisli, Tibor, to Xerox Corporation. Process for providing cemented glass flats to provide high speed multi-faceted polygonal scanners. 4,021,897, Cl. 29-25.130.

Fitzgerald, Maurice J.; Kolesinski, Henry S.; and Taylor, Lloyd D., to Polaroid Corporation. Photosensitive emulsion containing polyvinyl aminimide polymers. 4,022,623, Cl. 96-114.000.

Fives-Cail Babcock: *See—*
Pietryka, Joseph, 4,022,267.

Flannery, Robert J.: *See—*
Connolly, John F.; and Flannery, Robert J., 4,022,673.

Fletcher, James D. Bowstring draw and trigger release apparatus. 4,022,181, Cl. 124-35.00A.

Flexible Plastics Corporation: *See—*
Nielson, William W., 4,022,559.

Flocchini, Andrew J. Automated milking assembly. 4,022,158, Cl. 119-14.140.

Florio, Cesare. Eyeglass frame. 4,022,524, Cl. 351-83.000.

Florvall, Gosta Lennart: *See—*
Eriksson, Hans Erik; and Florvall, Gosta Lennart, 4,022,905.

Flournoy, Norman E.; Morris, David A.; and Agnew, Robert J., to Texaco Inc. Pulse-echo method and system for testing wall thicknesses. 4,022,055, Cl. 73-67.700.

FMC Corporation: *See—*
Alvarez, Manuel; and Fishman, Morris L., 4,022,672.
Jameson, Neal E., 4,022,498.
Kyrias, Gilbert M., 4,022,854.

Fohl, Artur. Acceleration and retardation responsive electric control device. 4,022,998, Cl. 200-61.45R.

Foik, Adolf: *See—*
Jutte, Hans; Babendererde, Siegmund; Bokemeyer, Reinhard; and Foik, Adolf, 4,022,029.

Foley, Charles F. Apparatus for playing matching game. 4,022,473, Cl. 273-130.00R.

Fong, Francis K.; and Winograd, Nicholas, to Purdue Research Foundation. Reversible photogalvanic cells for the conversion of solar radiation into electricity. 4,022,950, Cl. 429-105.000.

Fontanella, Luigi; Mariani, Luigi; and Tarzia, Giorgio, to Gruppo Lepetit S.p.A. Pharmacologically active pyrrolodiazepines. 4,022,766, Cl. 260-239.30B.

Ford Motor Company: *See—*
Allison, William D., 4,022,494.

Fordertechnik Hamburg Harry Lassig, Firma: *See—*
Lassig, Harry, 4,022,334.

Foresight Industries: *See—*
Deike, Robert F., 4,021,977.

Forichon, Gaston Sebastien, to Societe des Anciens Ateliers H. Jambon. Hydraulic presses, notably for shearing and cutting materials. 4,022,096, Cl. 83-617.000.

Formica Corporation: *See—*
See, Earl R.; and Slowicki, Gregory E., 4,021,893.

Forney International, Inc.: *See—*
Janse, Casper, 4,022,246.

Forni, Lucio; and Invernizzi, Renzo, to Societa' Italiana Resine S.I.R. S.p.A. Process and catalyst for the preparation of linear mono-olefines by catalytic dehydrogenation of linear paraffins. 4,022,840, Cl. 260-683.300.

Forsman, Nanna: *See—*
Andersson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Carling nee Ehrenberg, Elisabeth Charlotte, 4,022,758.

Fort Lock Corporation: *See—*
Falk, Morris, 4,022,107.

Foseco International Limited: *See—*
Courtenay, John Henry, 4,022,358.

Fowler, Herbert H., to White, Letcher T. Radiation-to-a.c. converter. 4,023,088, Cl. 322-2.00R.

Fox, Edward L., to Air Clean Damper Co., Inc. Damper sealing structure. 4,022,241, Cl. 137-240.000.

Fox, Jeffrey R.; and Walsh, William D., to GTE Laboratories Incorporated. Logic level converter. 4,023,050, Cl. 307-264.000.

Fr. Hesser Maschinenfabrik AG: *See—*
Kohnlein, Rolf; Domke, Klaus; Bandle, Walter; and Schottle, Helmut, 4,022,373.

Francois, Joseph S. Circular watercraft. 4,021,873, Cl. 9-2.00A.

Franetzki, Manfred; Korn, Volker; and Prestele, Karl, to Siemens Aktiengesellschaft. Apparatus for determination of respiratory passageway resistance. 4,022,193, Cl. 128-2.080.

Frank, Donald D. Drill bit with suction and method of dry drilling with liquid column. 4,022,285, Cl. 175-65.000.

Franklin, Charles H.: *See—*
Vinton, Clarence S.; and Franklin, Charles H., 4,022,875.

Frappier, Robert H., to International Paper Company. Method and apparatus for folding box flaps. 4,022,116, Cl. 93-51.00M.

Fraser, David Bruce, to Bell Telephone Laboratories, Incorporated. Multilevel metallization for integrated circuits. 4,022,930, Cl. 427-86.000.

Freakes, Anthony; Ventz, George A.; and Dove, Arthur I., to General Corrugated Machinery Co., Inc. Apparatus for orienting case blanks. 4,022,332, Cl. 214-6.00C.

Freed, Meier E., to American Home Products Corporation. 10-Aryl-1,2,3,4-tetrahydropyrazino(1,2-α)indole and derivatives thereof. 4,022,778, Cl. 260-250.0BC.

Freeman, William R., Jr.; and Dardi, Louis E., to Howmet Turbine

Components Corporation. Method for treating superalloy castings. 4,021,910, Cl. 29-526.200.

Freidenzon, Evgeny Zakharovich: *See—*
Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich, 4,022,048.

French, Gordon B., to Occidental Petroleum Corporation. Recovery of liquid and gaseous products from an in situ oil shale retort. 4,022,511, Cl. 299-2.000.

French, Raymond L. Batter-board support. 4,022,437, Cl. 256-26.000.

Fressineau, Jean-Louis: *See—*
Bourrez, Jean-Marie; Chemla, C. Nessin; Fressineau, Jean-Louis; and Hubert, Maurice, 4,023,023.

Friedrich Kocks, Firma: *See—*
Gerhards, Hans Dieter; and Moltner, Hermann, 4,022,049.

Frigo, Vito, to Ausatuft S.p.A. Machine for dressing continuous web materials in stretched condition on a plurality of frames. 4,022,091, Cl. 83-175.000.

Fritts, David H., to United States of America, Air Force. Electrode assembly for bipolar battery. 4,022,952, Cl. 429-210.000.

Fromnick, Stephen M.: *See—*
Barrow, William J.; Fromnick, Stephen M.; and Mayer, Robert, 4,023,102.

Frost, Henry Francis; Fabian, Fritz; Sharpe, Christopher James; and Jones, William Arthur, to Union International Company Ltd., The. Process for preparing chenodeoxycholic acid. 4,022,806, Cl. 260-397.100.

Fruman, Daniel H., to Hydronautics, Incorporated. Oil-water separation apparatus. 4,022,694, Cl. 210-350.000.

Fuchs, John R., to General Motors Corporation. Electric idle for internal combustion engine. 4,022,164, Cl. 123-1.00R.

Fueslein, Jerome L. Contour hammock. 4,021,868, Cl. 5-123.000.

Fuji Photo Film Co., Ltd.: *See—*
Hayashi, Katsumi; and Iijima, Yoo, 4,022,621.
Idota, Yoshio; and Shibaoka, Haruo, 4,022,677.
Miyamoto, Akio; and Matsukawa, Hiroharu, 4,022,624.
Okumura, Akio; Sugizaki, Atsushi; Ichijima, Seiji; Shiba, Keisuke; and Nakazyo, Kiyoshi, 4,022,620.

Fuji Xerox Co., Ltd.: *See—*
Tanimoto, Kenji, 4,023,080.
Yoshikawa, Akira, 4,023,181.

Fujikura, Hiroshi: *See—*
Ando, Takao; Fujikura, Hiroshi; Suzuki, Norishige; and Watanabe, Akira, 4,022,368.

Fujita, Toshio; Ishida, Katusada; and Funakoshi, Takehiko. Apparatus for detecting axial displacements in power windings of electric induction machines. 4,023,091, Cl. 324-34.00R.

Fujitsu Ltd.: *See—*
Baba, Masaru; and Inamori, Shuhei, 4,023,203.

Fukuda, Takeshi: *See—*
Itoh, Kunio; Kuga, Naoyoshi; and Fukuda, Takeshi, 4,022,747.

Fukuda, Tsuguo: *See—*
Hirano, Hitoshi; and Fukuda, Tsuguo, 4,022,652.

Funakoshi, Takehiko: *See—*
Fujita, Toshio; Ishida, Katusada; and Funakoshi, Takehiko, 4,023,091.

Furuse, Tokio: *See—*
Itou, Tomio; Ishikawa, Michio; and Furuse, Tokio, 4,023,128.

Fussell, Gerald W. Transient and surge protection apparatus. 4,023,071, Cl. 361-56.000.

Fuzishima, Minoru: *See—*
Nishizawa, Hiroshi; and Fuzishima, Minoru, 4,022,955.

G.A. Serlachius Oy: *See—*
Rimpinen, Heikki; and Kohonen, Martti, 4,021,966.

Gadebusch, Hans H.: *See—*
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GAF Corporation: *See—*
Erb, Edward R.; and Faust, Kenneth J., 4,022,943.
Russo, Robert Victor, 4,022,718.

Gaintsev, Viktor Andreevich: *See—*
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.

Gajajiva, Padej, to I-T-E Imperial Corporation EFCOR Division. Ground connector. 4,022,966, Cl. 174-65.0SS.

Galgon Industries, Inc.: *See—*
Roderick, Zackary A.; and Ross, Robert G., 4,022,415.

Galves, Jean Pierre; and Sagnard, Jean, to Thomson-CSF. Luminescent screen and image-converter tubes utilizing such a screen. 4,023,039, Cl. 250-486.000.

Galvin, Aaron A., to American District Telegraph Company. Alarm system for detecting disturbance of a solid medium. 4,023,156, Cl. 340-274.00R.

Gama, Jean-Michel; and Kung, Jean-Pierre, to Commissariat a l'Energie Atomique. Thermal shield system for the primary vessel suspension strake of a fast reactor. 4,022,658, Cl. 176-40.000.

Gancy, Alan B.; and Poncha, Rustom P., to Allied Chemical Corporation. Soluble silicate reduction in sodium carbonate crystallizer mother liquors. 4,022,867, Cl. 423-184.000.

Ganellin, Charon Robin: *See—*
Durant, Graham John; Emmett, John Colin; and Ganellin, Charon Robin, 4,022,797.

Gaouditz, Nicolas; Le Borgne, Edouard; and Mogavero, Robert, to Commissariat a l'Energie Atomique. Device for limiting accidental pressure overloads in a nuclear reactor confinement structure. 4,022,655, Cl. 176-38.000.

Garcea, Giampaolo, to Alfa Romeo S.p.A. Exhaust conveying system for internal combustion engines. 4,022,019, Cl. 60-282.000.

Garcia, Uville A. Operation counter for power take-off clutches associated with wrecker hoisting winches. 4,023,015, Cl. 235-92.0PD.

Gardiner, Phillip J.; and Schneider, Cyril, to Miles Laboratories, Inc. Use of 1-decarboxy-1-hydroxymethyl-PGE$_1$ in therapeutic bronchodilation. 4,022,912, Cl. 424-331.000.

Gardner-Denver Company: *See—*
Brink, Robert A.; Ertel, Richard L.; and Thompson, Stephen A., 4,022,550.

Garkusha, Anatoly Viktorovich; Shnee, Yakov Isidorovich; Ponkratova, Anna Grigorievna; Sukhinin, Viktor Pavlovich; Arkadiev, Boris Abramovich; and Moskvina, Ljudmila Dmitrievna. Turbomachine rotor wheel. 4,022,544, Cl. 416-193.00R.

Garner, Robert; and Dunnenberger, Max, to Ciba-Geigy AG. Process for the manufacture of N-substituted indoles. 4,022,802, Cl. 260-319.100.

Garrett Corporation, The: *See—*
Smith, Robert L.; and Goodrich, Joseph A., 4,022,516.

Garrett, Hoke M.; and Murray, James A., to Kaiser Industries Corporation. Manufacture of cement in rotary vessels. 4,022,629, Cl. 106-100.000.

Gates, Wendall C.: *See—*
Schontzler, J. Gordon; and Gates, Wendall C., 4,022,059.

Gattaz, Yvon. Electrical rotary coaxial connector. 4,022,518, Cl. 339-8.00R.

Gattuso, Marion J.: *See—*
Arnold, Robert J.; and Gattuso, Marion J., 4,022,828.

Gaudet, Gary G.: *See—*
Palilla, Frank C.; Gaudet, Gary G.; and Lingertat, Helmut, 4,022,870.

Gautier, Jean-Jacques: *See—*
de Cazenove, Hubert E.; Doyen, Daniel; Dussidour, Jacques M.; and Gautier, Jean-Jacques, 4,022,844.

Gea Luftkuhlergesellschaft Happel GmbH & Co. KG: *See—*
Schulenberg, Franz J., 4,022,853.

Gehman, David R.: *See—*
Lewis, Sheldon N.; Gehman, David R.; and Haggard, Richard A., 4,022,730.

Gehrmann, Klaus: *See—*
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Gele, Pierre: *See—*
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Laprade, Bernard; Laprade, Xavier; and Gele, Pierre, 4,022,175.

General Atomic Company: *See—*
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General Corrugated Machinery Co., Inc.: *See—*
Freakes, Anthony; Ventz, George A.; and Dove, Arthur I., 4,022,332.

General Dynamics Corporation: *See—*
Kaye, Samuel, 4,022,585.

General Electric Company: *See—*
Bishop, Everett Reece; and Leroux, Marcel Henri, 4,023,085.
Davis, Donald H.; and Mossey, John G., 4,022,424.
Earing, Mason H., 4,022,635.
Gordon, Gerald M.; and Cowan, Robert L., II, 4,022,662.
MacKenzie, Burton Thornley, Jr.; and Rothenberg, Sidney, 4,022,945.
Plunkett, Allan Barr, 4,023,083.
Smith, Bart Alan; Brayman, Kenneth Wood; and Pillow, Norman Wayne, 4,022,661.
Stackhouse, Bill L.; and Taylor, Theodore E., 4,022,973.
Stanley, Max W., 4,022,547.
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Wolfe, Allen Robert, 4,023,125.
Young, Eric A., 4,022,540.

General Foods Corporation: *See—*
La Tour, Diane Jean, 4,022,916.
Mitchell, William Alexander; and Seidel, William Charles, 4,022,924.

General Motors Corporation: *See—*
Ballantyne, David B., 4,022,099.
Fuchs, John R., 4,022,164.
Perrigo, Wallace; and Spears, Esten W., Jr., 4,022,541.
Saczawa, John S., Jr., 4,022,505.

General Tire & Rubber Company, The: *See—*
Maxey, Edwin Morgan, 4,022,856.

Gentry, Charles B.; and Phillips, William A., to AGM Industries, Inc. Industrial heating. 4,022,571, Cl. 432-180.000.

Genzer, Jerome D.: *See—*
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,022,796.

George Hyman Construction Company, The: *See—*
Goetjen, Ted G., 4,022,556.

Georgi, Donald Kenneth, to Graco Inc. Open circuit detector. 4,023,073, Cl. 361-45.000.

Gerber, Arthur H., to Horizons Research Incorporated. Triamino pyridine compounds. 4,022,793, Cl. 260-294.80F.
Gerecht, John Fred, to Colgate-Palmolive Company. Thioethers. 4,022,829, Cl. 260-558.00S.
Gerhards, Hans Dieter; and Moltner, Hermann, to Friedrich Kocks, Firma. Rolling mills. 4,022,049, Cl. 72-234.000.
Gertsch AG: *See—*
Gertsch, Ulrich, 4,022,492.
Weigl, Erwin; and Svoboda, Josef, 4,022,493.
Gertsch, Ulrich, to Gertsch AG. Release-ski binding. 4,022,492, Cl. 280-618.000.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Drobnik, Stefan, 4,022,708.
Gewerkschaft Eisenhutte Westfalia: *See—*
Jutte, Hans; Babendererde, Siegmund; Bokemeyer, Reinhard; and Foik, Adolf, 4,022,029.
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Slavik, Valter; Ghirlanda, Hieronimus; Ritter, Helmut; and Durr, Arthur, 4,022,389.
Ghosh, Sambhunath; and Klass, Donald L., to Institute of Gas Technology. Two phase anaerobic digestion. 4,022,665, Cl. 195-27.000.
Gibson, Keith C.; Hookins, John M.; and Oxlade, Roy R., to British Steel Corporation. Mill roll mounting. 4,021,900, Cl. 29-117.000.
Giddens, Kermit E.: *See—*
McMullan, James P.; Giddens, Kermit E.; and Borst, Melville E., 4,022,349.
Gilb, Tyrell T.; and Clarkson, Raymond E., to Simpson Manufacturing Co., Inc. Knee brace for glulam and heavy timber construction. 4,022,537, Cl. 403-386.000.
Gill, Joseph Anthony, to Leeco, Inc. Auger. 4,022,286, Cl. 175-313.000.
Girling Limited: *See—*
Southam, Terence George, 4,022,305.
Taft, Philip Augustus, 4,022,111.
Gitchel, James Wallace. Sailing craft. 4,022,144, Cl. 114-104.000.
GKN Transmissions Limited: *See—*
Pagdin, Brian Colin; Webb, Oswald; Rolt, Anthony Peter Roylance; and Walker, Frederick James, 4,022,084.
Gladenbeck, Jurgen; and Muller, Gerald, to Felten & Guilleaume Carlswerk AG. High-strength rope. 4,022,010, Cl. 57-149.000.
Gladow, Dean E.: *See—*
Ankeny, Claude C.; Gladow, Dean E.; and Wierzbicki, Charles E., 4,023,000.
Glass, Carl R. Molded scroll designs for fence structure. 4,022,435, Cl. 256-1.000.
Glasser, Herman; and Panetta, Patrick F., to Nuclear Associates, Inc. Radiation eye shield. 4,021,862, Cl. 2-431.000.
Glassman, Jacob A. Disposable diaper with a supplemental insert. 4,022,210, Cl. 128-284.000.
Gleason, John Gerald, to SmithKline Corporation. Substituted phenylglycylcephalosporins. 4,022,895, Cl. 424-246.000.
Gleason, Martin G. Fishline jerking device, bite signal and scale. 4,021,957, Cl. 43-16.000.
Glenn, Richard L.: *See—*
McBride, Donald W.; Glenn, Richard L.; and Cooper, Barry A., 4,022,862.
Goetjen, Ted G., to George Hyman Construction Company, The. Concrete slab extruder having a free flight auger. 4,022,556, Cl. 425-64.000.
Goheen, David W.; and Barton, John S., to Crown Zellerbach Corporation. Process for producing reactive, homogeneous, self-bondable lignocellulose fibers. 4,022,965, Cl. 536-56.000.
Goldberg, Kenneth M. Credit card verifier. 4,023,014, Cl. 235-61.70B.
Goldberg, Louis. Orthodontic plier-type tool. 4,021,922, Cl. 32-66.000.
Goldhaft, Tevis M.; Kaitz, Charles; and Maier, George D., to Damon Corporation. Disinfectant composition comprising a quaternary ammonium compound, a phenol, and formaldehyde. 4,022,911, Cl. 424-329.000.
Good, Thomas W., to Tonka Corporation. Wheel mounting for toy vehicles. 4,021,961, Cl. 46-201.000.
Goodman, Morris. Jewelry kit with decorative yarn or beads. 4,022,318, Cl. 206-223.000.
Goodrich, Joseph A.: *See—*
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Goodyear Aerospace Corporation: *See—*
Kolp, Edward J.; and Harrington, Girden W., 4,023,169.
Goodyear Tire & Rubber Company, The: *See—*
Lukich, Lewis T., 4,022,848.
Spoerke, Roger W., 4,022,831.
Goold, Reed: *See—*
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Goransson, Stig Kare, to Aktiebolaget Karlstads Mekaniska Werkstad. Apparatus for facilitating removal of a marine propeller blade. 4,022,543, Cl. 416-146.00R.
Gorbatov, Vasily Matveevich: *See—*
Saltykov, Alexandr Nikolaevich; Gorbatov, Vasily Matveevich; Saltykov, Jury Alexandrovich; and Saltykov, Oleg Alexandrovich, 4,021,884.
Gordon, Gerald M.; and Cowan, Robert L., II, to General Electric Company. Nuclear fuel element having a metal liner and a diffusion barrier. 4,022,662, Cl. 176-82.000.
Gordon, Scott: *See—*
Barrett, Harrison H.; and Gordon, Scott, 4,023,036.
Goto, Kenjiro, to Mansei Kogyo Kabushiki Kaisha. Gas-fueled electric lighter. 4,022,566, Cl. 431-132.000.
Gotul. Kern & Sohn: *See—*
Sauter, Martin, 4,022,289.
Gould Inc. Electric Fuse Division: *See—*
Swain, Kenneth W., 4,023,134.
Govignon, Jacques P., to Varian Associates. Wide angle fundus illumination and photography apparatus. 4,023,189, Cl. 354-62.000.
Govzman, Boris Izrailevich; and Ogloblin, Ernst Aggeevich. Hydraulic control valve. 4,022,425, Cl. 251-324.000.
Graco Inc.: *See—*
Georgi, Donald Kenneth, 4,023,073.
Graco Metal Products, Inc.: *See—*
Saint, David, 4,022,510.
Grakaukas, Vitautas: *See—*
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Gray, Steven M. Telephone answering service console. 4,022,984, Cl. 179-91.00R.
Greene, Clarence Kirk. Cyclical energy transfer method and apparatus. 4,022,025, Cl. 60-641.000.
Greene, Leonard M., to Safe Flight Instrument Corporation. Sailboat steering indicator system. 4,022,150, Cl. 116-129.00T.
Greenhill, Ronald, to Lawrence Peska Associates, Inc. Self propelled lawn edging shears. 4,021,998, Cl. 56-241.000.
Greenwich, Warren W. Method and apparatus for erecting paper transplant pots. 4,022,115, Cl. 93-49.00R.
Gregg, Harold. Shoreline air compressors wherein swell water pumps the air. 4,022,549, Cl. 417-100.000.
Greiss, Rashad S., to Boeing Company, The. Upper deck main galley in a three deck, wide-bodied passenger airplane. 4,022,404, Cl. 244-118.00P.
Griffin, William P., Jr.: *See—*
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Griffith Laboratories, Limited, The: *See—*
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Griffith, Russell K., to Standard Oil Company. Thermoplastic nitrile resins. 4,022,957, Cl. 526-87.000.
Griffiths, David K., to United States Steel Corporation. Supersonic nozzle for submerged tuyere oxygen steelmaking process. 4,022,447, Cl. 266-266.000.
Gross, Stanley J., to Biological Developments, Inc. Methods and compounds for producing specific antibodies. 4,022,878, Cl. 424-1.500.
Groth, Steven L., to Caterpillar Tractor Co. Fibrous concrete batch forming system. 4,022,439, Cl. 259-165.000.
Grous, Philip P.: *See—*
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Grovesteen, William R.: *See—*
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Grubb, Albany D.; Mosakowski, Thomas S.; and Trumbly, Terry A., to Airco, Inc. Transparent panel having high reflectivity for solar radiation and a method for preparing same. 4,022,947, Cl. 428-432.000.
Grundman, Erwin W. Venetian umbrella. 4,022,233, Cl. 135-20.00M.
Grunwell, Joyce F.; and Petrow, Vladimir, to Richardson-Merrell Inc. Androst-4-en-19-ones. 4,022,769, Cl. 260-239.55R.
Gruppo Lepetit S.p.A.: *See—*
Fontanella, Luigi; Mariani, Luigi; and Tarzia, Giorgio, 4,022,766.
Parenti, Francesco; Coronelli, Carolina; Tamoni, Giorgio; and Lancini, Giancarlo, 4,022,884.
Gschwend, Heinz Werner, to Ciba-Geigy Corporation. 2-Pyrazolylbenzophenones. 4,022,800, Cl. 260-310.00R.
Gschwend, Heinz Werner, to Ciba-Geigy Corporation. Pyrazolobenzazepines. 4,022,801, Cl. 260-310.00R.
GSW Limited-GSW Limitee: *See—*
Martin, Douglas Earl, 4,022,183.
GTE Automatic Electric Laboratories Incorporated: *See—*
Kelly, Michael J.; Kobylar, Alex W.; Lindsay, Robert L.; Pitroda, Satyan G.; and Simon, Charles J., 4,022,991.
McLaughlin, Donald W.; and Lee, David Q., 4,022,981.
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Fox, Jeffrey R.; and Walsh, William D., 4,023,050.
Palilla, Frank C.; Gaudet, Gary G.; and Lingertat, Helmut, 4,022,870.
Schlafer, John, 4,023,126.
GTE Sylvania Incorporated: *See—*
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Gucwa, Eugene F., Jr.; Bussjager, Rudy C.; and Grantham, Arthur C., to Carrier Corporation. Protection system for electric motor. 4,022,598, Cl. 62-164.000.

Gudde, Lawrence J. Spool holder apparatus. 4,022,394, Cl. 242-129.600.
Gulf Oil Corporation: *See—*
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Gulf Research & Development Company: *See—*
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Bludis, Joseph A.; Lyzinski, David; McKinney, Joel D.; Sebulsky, Raynor T.; and Stauffer, Harry C., 4,022,683.
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Kobylinski, Thaddeus P.; and Swift, Harold E., 4,022,810.
Onopchenko, Anatoli; and Schulz, Johann G. D., 4,022,838.
Gundersen, Helge Guttorm, to A/S Farmaceutisk Industri. Antibacterially active hexamethylene-bis-biguanides. 4,022,834, Cl. 260-564.00B.
Gunn, Donald J., to Crouse-Hinds Company. Sealing locknut. 4,022,262, Cl. 151-7.000.
Gurgui, Constantin; Luca, Vasile; Eckardt, Andrei; and Ciulacu, Paraschiv, to Intreprinderea "Bucuresti" Pentru Extragerea, Prelucrarea si Montarea Marmurei si Pietrei de Constructii. Apparatus for producing a decorative building material. 4,022,650, Cl. 156-498.000.
Gute, Robert M.: *See—*
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Gutierrez, Eddie N.; and Lamberti, Vincent, to Lever Brothers Company. Process for preparing isocitric acid, alloisocitric acid and lactones thereof. 4,022,803, Cl. 260-343.600.
Hackmack, Gerhard; and Klosa, Josef, to Byk Gulden Lomberg Chemische Fabrik GmbH. 4,4-Diarylpiperidines and process of making the same. 4,022,786, Cl. 260-293.720.
Hackstein, Karl-Gerhard; and Spener, Gerhard, to HOBEG Hochtemperaturreaktor-Brennelement GmbH. Process for working up block shaped graphite fuel elements. 4,022,865, Cl. 423-4.000.
Hadley, Seth Paul. Record storage apparatus. 4,022,320, Cl. 206-310.000.
Hafstrom, Warren Richard, to Whirlpool Corporation. Flywheel impelled cycle signal for appliance. 4,022,147, Cl. 116-67.00R.
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Haker, Gerd. Mould for making and holding working models for the manufacture of dental prostheses. 4,022,419, Cl. 249-54.000.
Hala, Alfred A., to Hohmann & Barnard, Inc. Rotatably pivotal stone anchor and stone anchor construction system. 4,021,989, Cl. 52-713.000.
Hale, William J.: *See—*
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Haley, George D., to R. C. Metals, Inc. Metallurgical material and process for treating iron or steel therewith. 4,022,613, Cl. 75-53.000.
Hall, David J. Navigation system and method. 4,023,018, Cl. 235-150.270.
Hall, John Robson: *See—*
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Hall, Leo M.: *See—*
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Hall, Tracy R.: *See—*
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Hallagin, Elmer L. Fold-away hook platform. 4,022,293, Cl. 182-150.000.
Hallenbeck, Norman P.; and Willard, Stephen F., to Hallenbeck Sales Co., Inc. Stamping press with augmented power stroke. 4,022,052, Cl. 72-429.000.
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Hallstrom, Earle A.: *See—*
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Halperin, Abraham. Restraining device for dogs and other animals. 4,022,161, Cl. 119-96.000.
Halstead, Raymond T.: *See—*
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Hamblen, David P., to Eastman Kodak Company. Method for making a plastic optical element having a gradient index of refraction. 4,022,855, Cl. 264-1.000.
Hamlin, Robert N., to Remington Arms Company, Inc. Non-shearing metering dispenser for shell loading machines. 4,022,353, Cl. 222-276.000.
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Hanmura, Hisao; Satou, Nobuo; Kawano, Shigeyoshi; Iwasaka, Tatsuo; and Kinoshita, Hiroshi, to Hitachi, Ltd. Apparatus for detecting the number of objects. 4,023,135, Cl. 340-1.00R.
Hansen, Charles C., III; Nilles, John D.; and Kivioja, Olaf E., to Refrigerating Specialties Company. Flexible diaphragm construction. 4,022,114, Cl. 92-98.00R.
Hansen, Elo Harald; and Ruzicka, Jaromir, to Block Engineering, Inc. Automatic chemical analyzer. 4,022,575, Cl. 23-230.00R.
Hansen, Peter Bregnedal: *See—*
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Hansen, Quinten A., to Scott Brake, Inc. Spring-applied electromagnetically-released brake. 4,022,301, Cl. 188-72.100.
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Haraikawa, Tetsuo, to Tokico Ltd. Disc brake for two-wheeled vehicle. 4,022,297, Cl. 188-26.000.
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Hardies, Donald E.; and Rinehart, Jay K., to PPG Industries, Inc. Herbicidal fluorinated carbonates. 4,022,609, Cl. 71-106.000.
Hardy, Donald F.: *See—*
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Harrington, Girden W.: *See—*
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Harris, Robert S.; and Nizel, Abraham E., to Massachusetts Institute of Technology. Cariostatic compositions and method of application. 4,022,887, Cl. 424-128.000.
Harris, Steven Clay. Stage prop. 4,022,461, Cl. 272-22.000.
Harry Ferguson Limited: *See—*
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Hawking, Brian Rae, to Beecham Group Limited. Dentifrice. 4,022,881, Cl. 424-52.000.
Hayashi, Katsumi; and Iijima, Yoo, to Fuji Photo Film Co., Ltd. Photographic developer composition. 4,022,621, Cl. 96-66.300.
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Heinonen, Russell M. Drying device. 4,022,560, Cl. 425-317.000.
Heinrich, Hans Jurgen. Mixing chamber for thickening sewage sludge by means of a flocculation agent combined with overflow drainage means. 4,022,691, Cl. 210-202.000.
Helgesson, Claes Ivar, to Arbman Development AB. Screw-socket fixture. 4,022,101, Cl. 85-85.000.
Hemdal, Goran Anders Henrik, to Telefonaktiebolaget L M Ericsson. Apparatus for rearrangement of a switching network. 4,022,982, Cl. 179-15.0AT.
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Hidaka, Takehiko, to Agency of Industrial Science & Technology. Object discerning method and apparatus using a spatial wave propagation. 4,023,173, Cl. 343-17.000.
Hidaka, Yoshiaki, to Honda Giken Kogyo Kabushiki Kaisha. Shifting mechanism for power transmission. 4,022,079, Cl. 74-476.000.
Hill, Amos Grover, to Hesston Corporation. Crop conditioning rotor. 4,021,995, Cl. 56-1.000.
Hill, Frederick William Leslie, to Raychem Limited. Heat recoverable connection. 4,022,519, Cl. 339-30.000.
Hilleman, Maurice R.; and McAleer, William J., to Merck & Co., Inc. Vaccine delivery system. 4,022,206, Cl. 128-216.000.
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Hirai, Hironori. Yarn piecing method for open-end spinning machine. 4,022,011, Cl. 57-156.000.
Hirano, Hitoshi; and Fukuda, Tsuguo, to Tokyo Shibaura Electric Co., Ltd. Method of growing multiple monocrystalline layers. 4,022,652, Cl. 156-605.000.
Hirosawa, Shingo, to Aikoh Co., Ltd. Variable capacity type gear pump. 4,022,551, Cl. 417-440.000.
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Houston, Herbert J.; Bolt, Kenneth D.; Chadwick, William H., Jr.; and Hall, Tracy R., to Slater Steel Industries Limited; and Sherman & Reilly, Inc. Methods of stringing bundle conductors. 4,022,431, Cl. 254-134.3PA.

Howard, Laurence M.; and Schaaf, Robert, to Air Filters, Inc. Removable filter cloth for a leaf filter of a pressure vessel. 4,022,695, Cl. 210-486.000.

Howes, John Gordon Bernard; Selway, Rupert Aleck; da Costa, Nicholas Mario; and Potter, William Duncan, to Warner-Lambert Company. Novel copolymer having utility as contact lens. 4,022,754, Cl. 260-47.0UA.

Howmet Turbine Components Corporation: *See—*
Freeman, William R., Jr.; and Dardi, Louis E., 4,021,910.

Howorth, Frederick Hugh. Textile yarn processing machines. 4,022,006, Cl. 57-34.500.

Hoyle, Geoffrey, to British Steel Corporation. Electroslag refining. 4,022,264, Cl. 164-52.000.

Hoyle, Wallis I.; and Schmunk, John D., to Hancor, Inc. Irrigation tubing. 4,022,384, Cl. 239-542.000.

Hrebar, Matthew James. Secondary side mounted gunsight and arrangement, for auxiliary use with a primary top mounted telescopic rifle sight. 4,021,926, Cl. 33-258.000.

Hrovat, Milan; Becker, Hans-Joachim; and Huschka, Hans, to Hochtemperaturreaktor-Brennelement GmbH. Spherical fuel elements made of graphite for high temperature reactors. 4,022,663, Cl. 176-82.000.

Huber, Bernhard Werner: *See—*
Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,022,530.

Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., to Diagnostic Data, Inc. Radioactive labeled orgotein. 4,022,877, Cl. 424-1.000.

Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., to Diagnostic Data, Inc. Esterified orgotein. 4,022,888, Cl. 424-177.000.

Huber, Wolfgang: *See—*
Saifer, Mark G.; Williams, Lewis D.; and Huber, Wolfgang, 4,022,224.

Hubert, Maurice: *See—*
Bourrez, Jean-Marie; Chemla, C. Nessin; Fressineau, Jean-Louis; and Hubert, Maurice, 4,023,023.

Hughes Aircraft Company: *See—*
Miller, Leroy J., 4,022,934.

Hughes, Leonard, to Health Systems Management Corporation. Student-programmable educational instrumentation device. 4,021,933, Cl. 35-10.000.

Hunsucker, Jerry Hoyt, to IMC Chemical Group, Inc. Method of inhibiting the growth of bacteria using quaternary ammonium compounds. 4,022,909, Cl. 424-312.000.

Hunt, Shelley M. Chair support stretcher. 4,022,417, Cl. 248-440.000.

Hurst, John W., to Chrysler Corporation. Drive coupling and clutches. 4,022,308, Cl. 192-21.000.

Huschka, Hans: *See—*
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Hutchinson, Peter L. V.: *See—*
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Hutt, Marland Paul: *See—*
Tinney, Francis John; Nicolaides, Ernest D.; Hutt, Marland Paul; and Mich, Thomas Frederick, 4,022,761.

Hwang, Frank Kwangming, to Bell Telephone Laboratories, Incorporated. Efficient one-sided rearrangeable multistage switching network. 4,023,141, Cl. 340-166.00R.

Hydronautics, Incorporated: *See—*
Fruman, Daniel H., 4,022,694.

Hygeia Corporation: *See—*
Walters, Ronald D., 4,021,870.

I. C. L. Scientific: *See—*
Parker, James E., 4,022,576.

I-T-E Imperial Corporation EFCOR Division: *See—*
Gajajiva, Padej, 4,022,966.

Ichihara, Mamoru, to Daido-Maruta Finishing Co. Ltd. Method for treating knitted fabrics containing cotton fibers with alkali hydroxides. 4,022,574, Cl. 8-125.000.

Ichijima, Seiji: *See—*
Okumura, Akio; Sugizaki, Atsushi; Ichijima, Seiji; Shiba, Keisuke; and Nakazyo, Kiyoshi, 4,022,620.

Ichikawa, Seiichi. Feeding apparatus of members to be crimped in crimping tools. 4,022,051, Cl. 72-410.000.

Ichimaru, Tadashi: *See—*
Takeya, Kenji; Suzuki, Hiroshi; and Ichimaru, Tadashi, 4,022,750.

Idaszak, Leo R., to CPC International Inc. Process for fluidization. 4,021,927, Cl. 34-10.000.

Idemitsu, Kosan Kabushiki-Kaisha (Idemitsu Kosan Co., Ltd.): *See—*
Honna, Kosaku; Shimizu, Nobuaki; and Kurisaki, Konomu, 4,022,845.

Idota, Yoshio; and Shibaoka, Haruo, to Fuji Photo Film Co., Ltd. Electrolytic cell. 4,022,677, Cl. 204-263.000.

IFE Gesellschaft mbH: *See—*
Kuschel, Konrad, 4,023,021.

Iijima, Yoo: *See—*
Hayashi, Katsumi, and Iijima, Yoo, 4,022,621.

Ikeda, Yasunori: *See—*
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Ikegai Iron Works, Ltd.: *See—*
Kawamura, Yuzo; Takiura, Mamoru; and Hayashizaki, Yoshihiro, 4,022,440.

Ikekawa, Nobuo: *See—*
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Ikrath, Kurt; Kennebeck, William; and Shaffer, Edward C., to United States of America, Army. Camouflage VHF antenna. 4,023,179, Cl. 343-713.000.

Ilin, Viktor Mikhailovich: *See—*
Zhiklenkox, Viktor Konstantinovich; Ilin, Viktor Mikhailovich; Martynenkov, July Fedorovich; Petukhov, Nikolai Kuzmich; and Volkov, Nikolai Vasilievich, 4,022,085.

Illing, Henry: *See—*
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Illinois Tool Works Inc.: *See—*
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Imboden, Walter H.; and Burleson, Aaron, to Burlington Industries, Inc. Pantyhose construction. 4,021,861, Cl. 2-409.000.

IMC Chemical Group, Inc.: *See—*
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Imperial Chemical Industries Limited: *See—*
Bamfield, Peter; and Quan, Peter Michael, 4,022,795.
Doyle, Martin; and Smith, Stephen Collyer, 4,022,780.

Imperial-Eastman Corporation: *See—*
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Inaba, Nobuaki; and Hoashi, Kenzo, to Kabushiki Kaisha Komatsu Seisakusho. Hydraulic circuit for controlling actuators in a construction vehicle. 4,022,023, Cl. 60-445.000.

Inagaki, Mitsuo; Sasaya, Hideaki; and Kobayashi, Akihiro, to Nippon Soken, Inc. Collision detecting apparatus for motor vehicles. 4,022,997, Cl. 200-61.45R.

Inamori, Shuhei: *See—*
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Indak Manufacturing Corporation: *See—*
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Indicon Inc.: *See—*
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Industria Napoletana Costruzione Autoveicoli Alfa Romeo ALFASUD S.p.A.: *See—*
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Infrared Surveys, Incorporated: *See—*
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Ingersoll-Rand Negri-Bossi S.p.A.: *See—*
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Institute of Gas Technology: *See—*
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International Business Machines Corporation: *See—*
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Feng, Bai Cwo, 4,022,932.
Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried K., 4,023,148.
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Pfeiffer, Aloysius T.; and Romankiw, Lubomyr T., 4,022,927.
Schuenemann, Claus; and Tsui, Frank, 4,023,147.
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International Paper Company: *See—*
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International Standard Electric Corporation: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Intreprinderea "Bucuresti" Pentru Extragerea, Prelucrarea si Montarea Marmurei si Pietrei de Constructii: *See—*
Gurgui, Constantin; Luca, Vasile; Eckardt, Andrei; and Ciulacu, Paraschiv, 4,022,650.

Invernizzi, Renzo: *See—*
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Irick, Gether, Jr.: *See—*
Newland, Gordon C.; Irick, Gether, Jr.; and Larkins, Thomas H., Jr., 4,022,632.
Irvin Industries, Inc.: *See—*
Rain, Lloyd Howard, 4,022,522.
Isaacs, Harold. Wheeled support and transport platform. 4,022,413, Cl. 248-23.000.
Ishida, Katusada: *See—*
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Ishida, Yotsuo; and Kuwahara, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha; and Tokyo Electric Power Co., Ltd. Discharge gap device. 4,023,076, Cl. 361-118.000.
Ishikawa, Akira: *See—*
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Ishikawa, Kunio: *See—*
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Ishikawa, Michio: *See—*
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Ishimaru, Toshiyasu. Cephalosporin esters. 4,022,773, Cl. 260-243.00C.
Ishimoto, Sachio: *See—*
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Itoh, Kunio; Kuga, Naoyoshi; and Fukuda, Takeshi, to Shin-Etsu Chemical Company Limited. Silicone rubber compositions. 4,022,747, Cl. 260-37.0SB.
Itou, Tomio; Ishikawa, Michio; and Furuse, Tokio, to TDK Electric Co., Ltd. Temperature responsive reed switch. 4,023,128, Cl. 335-208.000.
ITT Industries, Inc.: *See—*
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ITW Fastex Italia, S.p.A.: *See—*
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Iwasaka, Tatsuo: *See—*
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J. A. Freeman & Son, Inc.: *See—*
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Spaude, Walter Charles; Wichman, Thomas Duane; Corrigan, Michael Thomas; and Joannon, Jimmie Carl, 4,021,992.
J. P. Tool, Inc.: *See—*
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Jackman, Joseph R., to Reactive Metals & Alloys Corporation. Apparatus for adding mischmetal to molten steel. 4,022,444, Cl. 266-216.000.
Jackson, Jerome E., to Addressograph Multigraph Corporation. Ion modulator having independently controllable bias electrode. 4,022,528, Cl. 355-3.00R.
Jackson, Jerome Edward, to Addressograph-Multigraph Corporation. Ion modulator having independently controllable bias electrode. 4,022,527, Cl. 355-3.00R.
Jackson, Samuel G. Cotton gin control. 4,021,887, Cl. 19-66.00R.
Jackson, Thomas E., to Sandoz, Inc. Substituted oxazoles and thiazoles as herbicides. 4,022,607, Cl. 71-88.000.
Jacobs, Glenn Anthony: *See—*
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Jahn, Walter: *See—*
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Jameson, Neal E., to FMC Corporation. Fluid loading arm swivel joint. 4,022,498, Cl. 285-16.000.
Jamshidi, Khosrow. Biopsy needle guard and guide. 4,022,191, Cl. 128-2.00B.
Janes, George Sargent; and Pike, Charles T., to Jersey Nuclear-Avco Isotopes, Inc. Increased ionization rate in laser enrichment. 4,023,038, Cl. 250-423.00P.
Janneck, Howard A., to Erika, Inc. Non-woven support screen for mass transfer devices. 4,022,692, Cl. 210-321.00B.
Janse, Casper, to Forney International, Inc. Damper assembly for closing a duct for hot gases. 4,022,246, Cl. 137-601.000.
Janssen, Peter Johannes Michiel: *See—*
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Japan Special Steel Co., Ltd.: *See—*
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Jenkins, Garry W. Package for disposal of chewing gum. 4,022,319, Cl. 206-233.000.
Jenkner, Herbert, to Chemische Fabrik Kalk GmbH. Bis-(guanidine)-tetrabromodian and its production. 4,022,698, Cl. 252-8.100.
Jensen, Wayne E., to B. & J. Manufacturing Company. Tire buffing machine blades having heat dissipation means. 4,021,899, Cl. 29-79.000.
Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Janes, George Sargent; and Pike, Charles T., 4,023,038.
Jett, Marion Barney, to Dresser Industries, Inc. Multiple string well packer. 4,022,274, Cl. 166-118.000.
Jin, Jung Il; and Kraft, Paul, to Stauffer Chemical Company. Cross-linked vinyl halide polymers as flame retardant additives for thermoplastics. 4,022,849, Cl. 260-876.00R.
Joannon, Jimmie Carl: *See—*
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John Wyeth & Brother Limited: *See—*
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Johnson, Anders A., to Monsanto Company. Solidification and crystallization of materials. 4,022,820, Cl. 260-475.00B.
Johnson, Burnett H., to Exxon Research and Engineering Company. Stabilization of high temperature plastics containing aryl-methylene arylene groups against thermal oxidative degradation. 4,022,751, Cl. 260-45.75C.
Johnson, Clifford T.; McCubbin, Melvin J.; McInnis, Patrick M.; and Mattis, Joseph F., to United States of America, Navy. Ejectable fuze. 4,022,130, Cl. 102-56.00R.
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Johnson, Hilding R.: *See—*
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Johnson, James R.; and Sowman, Harold G., to General Atomic Company. Coated particles. 4,022,660, Cl. 176-67.000.
Johnson & Johnson: *See—*
Levesque, Yvon George, 4,022,861.
Johnson, Keith G., to ARCO Polymers, Inc. Apparatus for making structural foam profiles. 4,022,557, Cl. 425-71.000.
Johnson, Kenneth C. Fastener. 4,022,100, Cl. 85-83.000.
Johnson, Michael B.: *See—*
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Johnson, Neil Arthur, to Alza Corporation. Intrauterine device remover. 4,022,198, Cl. 128-130.000.
Johnson, William Hugh, to Research Corporation. Cross-flow modular tobacco curing system. 4,021,928, Cl. 34-38.000.
Johnston, James R.: *See—*
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Jones, Garnon Anthony, to Locality Arts Limited. Picture mat cutter. 4,022 095, Cl. 83-455.000.
Jones, William Arthur: *See—*
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Jonson, Bjorn, to Siemens Aktiengesellschaft. Medical facial mask. 4,022,200, Cl. 128-141.00R.
Juhlin, Lars-Erik, to ASEA Aktiebolag. Control system for rectifier equipment. 4,023,086, Cl. 321-11.000.
Juhlin, Lars Erik; and Svensson, Kjell, to Allmanna Svenska Elektriska Aktiebolaget. Overvoltage protection for a direct current transmission. 4,023,087, Cl. 321-19.000.
Jutte, Hans; Babendererde, Siegmund; Bokemeyer, Reinhard; and Foik, Adolf, to Gewerkschaft Eisenhutte Westfalia; and Hochtief AG. Useful improvements in apparatus for, and in methods of, constructing a tunnel. 4,022,029, Cl. 61-85.000.
Juvonen, Vaino Esko, to Linden-Alimak AB. Hydraulically operated percussion device. 4,022,108, Cl. 91-276.000.
K-Line Industries, Inc.: *See—*
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Kabas, Guglielmo: *See—*
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Kaiser, Thomas A. Hockey helmet attachment. 4,022,466, Cl. 273-1.00B.

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Kalert, Ralph E.; and Schlage, Robert E., to ACF Industries, Incorporated. Vacuum controlled throttle positioner and dashpot. 4,022,179, Cl. 123-198.00D.

Kalinin, Alexandr Ivanovich: *See*—
Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich, 4,022,048.

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Kamijo, Noriyuki, to Kabushiki Kaisha Suwa Seikosha. Regulating device for electric timepieces. 4,022,013, Cl. 58-23.00R.

Kamioka, Toshiharu: *See*—
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Kamiya, Kazuo: *See*—
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Kammeraad, James A., to K-Line Industries, Inc. Methods for assembling and disassembling valve assemblies. 4,022,583, Cl. 29-156.70R.

Kampf, Gunther: *See*—
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Kane, Vinayak V.: *See*—
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Kanner, Bernard: *See*—
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Prokai, Bela; and Kanner, Bernard, 4,022,941.

Kanojia, Ramesh Maganlal, to Ortho Pharmaceutical Corporation. 17β-Ethynyl-3,17α-estradiol and derivatives thereof. 4,022,892, Cl. 424-238.000.

Karass, Thomas J.; Nguyen, Anh D.; and Vegvari, Paul, to Caristrap Corporation. Polymer plastic strapping from polyethylene terephthalate. 4,022,863, Cl. 264-210.00R.

Karl Lautenschlager KG Mobelbeschlagfabrik: *See*—
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Karliner, Rudolf R. Airless spray apparatus. 4,022,381, Cl. 239-126.000.

Karr, Fred A., to Shasta Beverages Division of Consolidated Food Corporation. Liquid carbon dioxide carbonation apparatus. 4,022,119, Cl. 99-275.000.

Kasai, Tsutomu: *See*—
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Kasulanis, Charles Francis: *See*—
Fabian, Arthur C.; Genzer, Jerome D.; Kasulanis, Charles Francis; Shavel, John, Jr.; and Zinnes, Harold, 4,022,796.

Kataoka, Shoei; and Tateno, Hiroshi, to Kogyo Gijutsuin. Negative resistance element composed of a semiconductor element. 4,023,196, Cl. 357-57.000.

Kato, Itsuko: *See*—
Kato, Masashi; Kato, Itsuko; Kato, Shouichi; Kato, Yasushi; and Kato, Takashi, 4,022,689.

Kato, Masashi; Kato, Itsuko; Kato, Shouichi; Kato, Yasushi; and Kato, Takashi. Rotating multitube biocontactor for treating sewage. 4,022,689, Cl. 210-151.000.

Kato, Satoru: *See*—
Kawamura, Tamio; Kato, Satoru; Ikeda, Yasunori; and Kuwana, Noriaki, 4,022,664.

Kato, Shouichi: *See*—
Kato, Masashi; Kato, Itsuko; Kato, Shouichi; Kato, Yasushi; and Kato, Takashi, 4,022,689.

Kato, Takashi: *See*—
Kato, Masashi; Kato, Itsuko; Kato, Shouichi; Kato, Yasushi; and Kato, Takashi, 4,022,689.

Kato, Yasushi: *See*—
Kato, Masashi; Kato, Itsuko; Kato, Shouichi; Kato, Yasushi; and Kato, Takashi, 4,022,689.

Kauffman, Robert T. Coil curler. 4,022,225, Cl. 132-31.00R.

Kaune, Manfred, to Diessel GmbH & Co. Apparatus for removing liquid samples. 4,022,066, Cl. 73-422.00R.

Kawamura, Tamio; Kato, Satoru; Ikeda, Yasunori; and Kuwana, Noriaki, to Eisai Co., Ltd. Process for biochemical optical resolution of alpha-tocopheral. 4,022,664, Cl. 195-2.000.

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Kawano, Shigeyoshi: *See*—
Hanmura, Hisao; Satou, Nobuo; Kawano, Shigeyoshi; Iwasaka, Tatsuo; and Kinoshita, Hiroshi, 4,023,135.

Kawarada, Akira: *See*—
Hashimoto, Tohru; Kawarada, Akira; and Tamura, Sachiko, 4,022,842.

Kawashima, Hiroyuki: *See*—
Takeshita, Toru; Hashimoto, Yoshinobu; Kawashima, Hiroyuki; Ishimoto, Sachio; Ikekawa, Nobuo; and Morisaki, Masuo, 4,022,891.

Kawolics, Raymond P.: *See*—
Basel, Donald R.; and Kawolics, Raymond P., 4,022,062.

Kaye, Samuel, to General Dynamics Corporation. Method for sealing composites against moisture and articles made thereby. 4,022,585, Cl. 428-551.000.

Kaye, Saul; and Whitney, William G., to W. G. Whitney Corporation. Plastic band and bail system for intravenous solution bottles. 4,022,416, Cl. 248-318.000.

Kefalas A/S: *See*—
Ujvari, Georg; and Hansen, Peter Bregnedal, 4,022,896.

Kehl, William L.: *See*—
Beuther, Harold; Kehl, William L.; and Swift, Harold E., 4,022,839.

Keizer, Eugene Orville, to RCA Corporation. Recording apparatus and metods for use in forming a video disc record having spirally aligned sync storage locations. 4,022,968, Cl. 358-128.000.

Keller, Dennis Herbert. Volleyball training and blocking device. 4,022,471, Cl. 273-102.400.

Kellner, Sam J. Reading stand. 4,022,418, Cl. 248-460.000.

Kelly, Michael J.; Kobylar, Alex W.; Lindsay, Robert L.; Pitroda, Satyan G.; and Simon, Charles J., to GTE Automatic Electric Laboratories Incorporated. Conferencing arrangement for use in a PCM system. 4,022,991, Cl. 179-18.0BC.

Kempermann, Theo: *See*—
Kreuder, Hans Joachim; Peltzer, Bernd; Beckers, Johannes; Kremer, Wolfgang; and Kempermann, Theo, 4,022,724.

Kendall Company, The: *See*—
Swallow, Roger T.; and Stanley, Leonard A., 4,021,860.

Kendall, Willard E. Counterbalancing hinge for range oven doors or the like. 4,021,968, Cl. 49-386.000.

Kennebeck, William: *See*—
Ikrath, Kurt; Kennebeck, William; and Shaffer, Edward C., 4,023,179.

Kennedy, Austin R. Q. Phone guard for locking out long-distance calls. 4,022,992, Cl. 179-189.00D.

Keough, Allen H.; and Pitts, Warren R., to Dennison Manufacturing Company. Label assemblies without die-cutting. 4,022,926, Cl. 428-41.000.

Kerr-McGee Chemical Corporation: *See*—
Murray, Edward Conley, 4,022,636.

Kessler, Bernard V.; and Hoff, Gerald F., to United States of America, Navy. Superheterojunction laser. 4,023,118, Cl. 331-94.50H.

Keyt, Ferris Gene: *See*—
Marin, M. James; and Keyt, Ferris Gene, 4,022,457.

Kharlan, Georgy Dmitrievich: *See*—
Vershinsky, Georgy Ottovich; Perfiliev, Evgeny Alexeevich; and Kharlan, Georgy Dmitrievich, 4,022,266.

Khoury, Nick S., to Continental Group, Inc., The. Hold down mechanism for lanced tab. 4,022,346, Cl. 220-273.000.

Kidd, Alan Lister; Eaves, Douglas; and Walmsley, Keith, to Dorman Smith Switchgear Limited. Electrical circuit breakers. 4,023,132, Cl. 337-82.000.

Kieley & Mueller, Inc.: *See*—
O'Connor, Joseph; and Illing, Henry, 4,022,423.

Kiichenmeister, Rolf: *See*—
Zabrocki, Karl; Dhein, Rolf; Kiichenmeister, Rolf; and Beer, Wolfgang, 4,022,726.

Kikuchi, Yoshitaka: *See*—
Nishibe, Atsushi; and Kikuchi, Yoshitaka, 4,023,206.

Kile, Walter A. Portable multi-purpose machine tool. 4,022,106, Cl. 90-12.00R.

Kimberly-Clark Corporation: *See*—
Timmons, Terry K.; and Endres, Dan D., 4,022,211.

Kimura, Makoto: *See*—
Takahasi, Riyota; Yamada, Takayosi; Kimura, Makoto; and Yosikawa, Seiji, 4,022,265.

Kimura, Takashi: *See*—
Sakakibara, Sakuichi; Sugisawa, Ko; Yamamoto, Masanori; Kimura, Takashi; and Sekiguchi, Kazuya, 4,022,921.

King, Hewson Nicholas Graham; and Washington, Derek, to U.S. Philips Corporation. Color tube having channel electron multiplier and screen pattern of concentric areas luminescent in different colors. 4,023,063, Cl. 313-400.000.

King, Hewson Nicholas Graham: *See*—
Schagen, Pieter; King, Hewson Nicholas Graham; and Washington, Derek, 4,023,064.

Kingswell, Henry, to Raymond Lee Organization, Inc., The, a part interest. Action toy. 4,021,963, Cl. 46-220.000.

Kinker, Donald E., to Diebold, Incorporated. On-line verification system for identification cards or the like. 4,023,013, Cl. 235-61.70B.

Kinney, Paul W.; and Kirk, Carl Walter. Method of spraying sealing composition to interior walls of storage tank. 4,022,935, Cl. 427-140.000.

Kinoshita, Hiroshi: *See*—
Hanmura, Hisao; Satou, Nobuo; Kawano, Shigeyoshi; Iwasaka, Tatsuo; and Kinoshita, Hiroshi, 4,023,135.
Kipping, Anders S. E.: *See*—
Lindblom, K. Julius; and Kipping, Anders S. E., 4,022,133.
Kirk, Carl Walter: *See*—
Kinney, Paul W.; and Kirk, Carl Walter, 4,022,935.
Kirk, James D., Jr. Honeycomb building wall construction. 4,021,983, Cl. 52-451.000.
Kirsch, Jeffrey W.; and Day, Edward A., to Systems, Science and Software. Air drag reducing means for bluff vehicles and the like. 4,022,508, Cl. 296-1.00S.
Kirschner, Barry Alex, to RCA Corporation. Analog to digital converter. 4,023,160, Cl. 340-347.0NT.
Kirschner, Horst; and Meyer, Wolfgang. Drilling or milling apparatus for the working of live bone, particularly for dentistry. 4,021,920, Cl. 32-28.000.
Kishi, Yoshio, to Sony Corporation. Tape cassette. 4,022,395, Cl. 242-198.000.
Kishi, Yoshio, to Sony Corporation. Tape cassette. 4,022,401, Cl. 242-198.000.
Kishner, Stanley J., to Kollmorgen Corporation. Reflectometer optical system. 4,022,534, Cl. 356-210.000.
Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, to International Standard Electric Corporation. Ring trip detector. 4,022,980, Cl. 179-18.0HB.
Kivioja, Olaf E.: *See*—
Hansen, Charles C., III; Nilles, John D.; and Kivioja, Olaf E., 4,022,114.
Klass, Donald L.: *See*—
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Klausner, Friedrich: *See*—
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Klein, Walter; and Nobis, Heinrich, to Didier-Werke AG. Hot-blast furnace with foamed silicate inner layer. 4,022,572, Cl. 432-214.000.
Klein, Wilfried: *See*—
Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried K., 4,023,148.
Kleine, Charles A.; and Middleton, Verne L., to Olin Corporation. Method of sizing heat exchange panels. 4,021,901, Cl. 29-157.30D.
Kljucaricek, Peter. Zagreb electrical circuit. 4,023,090, Cl. 323-47.000.
Klockenhoff, Herbert: *See*—
Sporenberg, Willi; and Klockenhoff, Herbert, 4,022,367.
Klosa, Josef: *See*—
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Klosterman, David P.: *See*—
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Klotz, Erhard: *See*—
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KMS Fusion, Inc.: *See*—
Burgeson, Duane A., 4,022,317.
Solomon, David E., 4,022,348.
Knapp, Edward J., Jr., to Chase-Shawmut Company, The. Blown fuse indicator. 4,023,133, Cl. 337-206.000.
Knobloch, James O.; and Ramirez, Fausto, to Standard Oil Company (Indiana). Esters prepared from diacylium complexes of tetrahaloterephthalic acid. 4,022,817, Cl. 260-475.00R.
Knop, Frederick L., Jr.: *See*—
Piepho, Donald A.; and Knop, Frederick L., Jr., 4,022,536.
Knudsen, David S., to McKenna Equipment Company Inc. Printing machine. 4,022,124, Cl. 101-36.000.
Kobashi, Toshiyuki; and Shiota, Hirotaka, to Japan Exlan Company Limited. Process for producing colloidal antimony oxide. 4,022,710, Cl. 252-313.00R.
Kobayashi, Akihiro: *See*—
Inagaki, Mitsuo; Sasaya, Hideaki; and Kobayashi, Akihiro, 4,022,997.
Kobayashi, Katsuomi: *See*—
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Kobayashi, Nobuo: *See*—
Mitsugi, Koji; Kobayashi, Nobuo; Shida, Toshiro; and Yokokawa, Yasunori, 4,022,666.
Nakajima, Shunichi; Kobayashi, Nobuo; and Ariga, Yoshio, 4,023,011.
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Kobe Steel Ltd.: *See*—
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Kobylar, Alex W.: *See*—
Kelly, Michael J.; Kobylar, Alex W.; Lindsay, Robert L.; Pitroda, Satyan G.; and Simon, Charles J., 4,022,991.
Kobylinski, Thaddeus P.; and Swift, Harold E., to Gulf Research & Development Company. Metal chrysotile methane synthesis catalyst. 4,022,810, Cl. 260-449.60M.
Koenig, Harry J., to United States of America, Navy. Parallel to serial digital converter. 4,023,144, Cl. 340-172.500.
Kogyo Gijutsuin: *See*—
Kataoka, Shoei; and Tateno, Hiroshi, 4,023,196.
Kohnlein, Rolf; Domke, Klaus; Bandle, Walter; and Schottle, Helmut, to Fr. Hesser Maschinenfabrik AG. Package with reinforcing insert. 4,022,373, Cl. 229-51.0AS.
Kohonen, Martti: *See*—
Rimpinen, Heikki; and Kohonen, Martti, 4,021,966.
Kohut, Joseph; and Olive, Joseph Philip, to Bell Telephone Laboratories, Incorporated. Adaptive linear prediction speech synthesizer. 4,022,974, Cl. 179-1.50M.
Koizumi, Hiroshi: *See*—
Mutoh, Fumio; Koizumi, Hiroshi; Yamasaki, Jun; and Ando, Toshifumi, 4,022,600.
Kokinos, Charles, Jr.: *See*—
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Kolesinski, Henry S.: *See*—
Fitzgerald, Maurice J.; Kolesinski, Henry S.; and Taylor, Lloyd D., 4,022,623.
Kollmorgen Corporation: *See*—
Kishner, Stanley J., 4,022,534.
Koloc, Paul M. Method and apparatus for generating and utilizing a compound plasma configuration. 4,023,065, Cl. 315-111.200.
Kolp, Edward J.; and Harrington, Girden W., to Goodyear Aerospace Corporation. Automatic frequency control circuit for frequency agile radar. 4,023,169, Cl. 343-17.20R.
Komahashi, Katsutoshi: *See*—
Saitoh, Shigeru; Watanabe, Tetsuya; and Komahashi, Katsutoshi, 4,022,869.
Konagai, Yoshihiro: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, 4,022,605.
Kondo, Toshio; Mori, Yoshinori; and Ishikawa, Masakazu, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Mounting structure for a disc brake actuator. 4,022,303, Cl. 188-73.300.
Kondo, Toshiyuki; and Nagashima, Takashi, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake control system. 4,022,514, Cl. 303-115.000.
Kondo, Yoshizi. Pile press driver. 4,022,433, Cl. 254-188.000.
Kononenko, Nina Stepanovna: *See*—
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna. Method for producing an iron electrode for an alkaline accumulator. 4,021,911, Cl. 29-623.500.
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, to Kumiai Chemical Industry Co., Ltd. Stabilized non-medical fungicidal, bactericidal and algicidal composition. 4,022,605, Cl. 71-67.000.
Koppensteiner, Gunter: *See*—
Conrad, Jens; Schnegelberger, Harald; Eckert, Hans-Werner; Saygin, Ferdi; and Koppensteiner, Gunter, 4,022,606.
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Coon, Clifford L., 4,022,825.
Kormany, Geza; Kabas, Guglielmo; Schlapfer, Hans; and Siegrist, Adolf Emil, to Ciba-Geigy Corporation. Styrene compounds. 4,022,772, Cl. 260-240.00C.
Korn, Volker: *See*—
Franetzki, Manfred; Korn, Volker; and Prestele, Karl, 4,022,193.
Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich. Mill for rolling continuous cast ingots. 4,022,048, Cl. 72-214.000.
Kostiainen, Aatos; Paakkinen, Ilmari; and Rantasuo, Paavo, to Enso-Gutzeit Osakeyhtio. Chip washer. 4,022,231, Cl. 134-133.000.
Kotcharian, Michel, to Technigaz. Heat insulating wall structure for a fluid-tight tank and the method of making same. 4,021,982, Cl. 52-410.000.
Kotsakis, Mike D., to Imperial-Eastman Corporation. One-piece nut and sleeve for improved tube fitting. 4,022,497, Cl. 285-4.000.
Kotuby, Paul M., to Risdon Manufacturing Company, The. Accumulator release pump. 4,022,354, Cl. 222-321.000.
Kovar, Robert F.; and Arnold, Fred E., to United States of America, Air Force. Bis-ethynyl heterocyclic compositions and method of snythesis. 4,022,746, Cl. 260-30.200.
Koziol, Konrad; Sieberer, Karl-Heinz; and Zenk, Baptist, to Conradty, C. Coated titanium anode for amalgam heavy duty cells. 4,022,679, Cl. 204-286.000.
Krafft, Joseph M.: *See*—
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Kraft, Paul: *See*—
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Krass, Alvin, to Krass, Alvin. Psychological testing apparatus. 4,022,975, Cl. 179-1.00N.
Kratz, Jerrold Kerwin; and Christensen, Edward Walter, II, to RCA Corporation. Deflection yoke with non-radial conductors. 4,023,129, Cl. 335-210.000.
Krause, Erich: *See*—
Schieber, Hans; and Krause, Erich, 4,022,033.
Kravitz, Margery Dena. Educational game apparatus. 4,021,937, Cl. 35-35.00H.

Kremer, Wolfgang: *See—*
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Krenzer, John: *See—*
Richter, Sidney B.; and Krenzer, John, 4,022,608.

Krenzler, Leo M. Wide-keeled boat hull with multiple, straight line planing surfaces. 4,022,143, Cl. 114-271.000.

Kress, Manfred: *See—*
Hermanns, Hans; Kress, Manfred; Schuster, Friedrich; and Schwabe, Kurt, 4,022,515.

Kressel, Henry; and Ettenberg, Michael, to RCA Corporation. Low beam divergence light emitting diode. 4,023,062, Cl. 313-498.000.

Kretschmer, Wolfgang, to Auergesellschaft GmbH. Detector tube. 4,022,578, Cl. 23-254.00R.

Kreuder, Hans Joachim; Peltzer, Bernd; Beckers, Johannes; Kremer, Wolfgang; and Kempermann, Theo, to Bayer Aktiengesellschaft. Nitrocellulose alkyd resin lacquers containing bis-(hydroxyphenyl)-alkanes. 4,022,724, Cl. 260-16.000.

Krishnaiyer, Ramesh; Donovan, John C.; and Esser, Frank J., to Johnson Controls, Inc. High security alarm transmission system. 4,023,163, Cl. 340-409.000.

Kristiansen, Haakon Henrik. Internal combustion engine and operating cycle. 4,022,167, Cl. 123-43.0AA.

Krofta, Milos. Apparatus for clarification of waste water operating on dissolved air flotation process. 4,022,696, Cl. 210-520.000.

Krokos, Raymond M., to Evans Products Company. Automobile tie down assembly. 4,022,134, Cl. 105-473.000.

Kroner, Klaus, to U.S. Philips Corporation. Touch control arrangement. 4,023,052, Cl. 307-308.000.

Krueger, Robert A., to Tri-Mark Metal Corporation. Water spray nozzle. 4,022,385, Cl. 239-592.000.

Krull, Felix B., to NCR Corporation. Electrodynamic actuator. 4,022,311, Cl. 197-1.00R.

Kubicek, Donald H.: *See—*
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Kucinski, Ronald J.: *See—*
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Kuechler, William L., to Entoleter, Inc. Formation of composite particulate material using high energy rotary impact milling. 4,022,749, Cl. 260-42.180.

Kuga, Naoyoshi: *See—*
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Kugelfischer Georg Schafer & Co.: *See—*
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Kuhn, Martin C.; and Arbiter, Nathaniel, to Anaconda Company, The. Recovery of metals. 4,022,866, Cl. 423-26.000.

Kulbakh, Valter Osvaldovich: *See—*
Etingov, Evgeny Davidovich; Bashkovich, Alexandr Pavlovich; Kulbakh, Valter Osvaldovich; Raigorodskaya, Valentina Yakovlevna; Popova, Inessa Vladimirovna; Alexeeva, Ljudmila Evgenievna; Nyn, Vladimir Semenovich; and Lokhina, Nadezhda Dmitrievna, 4,022,886.

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Kung, Jean-Pierre: *See—*
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Kuntziger, Ernest P., to S.A. des Anciens Etablissements Paul Wurth. Hot blast stove and method of operation. 4,022,573, Cl. 432-217.000.

Kurahashi, Suminobu: *See—*
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Sugeno, Katsuhiko; and Yamami, Toshimi, 4,022,860.

Kurisaki, Konomu: *See—*
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Kurita Water Industries Ltd.: *See—*
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Kuroda, Nobuyuki: *See—*
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Kurono, Hitoshi: *See—*
Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, 4,022,907.

Kurosaki, Mutsuo, to Nifco Inc. Linking device for uniting two plates in abutment. 4,021,890, Cl. 24-73.0PF.

Kurosawa, Shigeru; Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, to Showa Denko Kabushiki Kaisha. Novel polymer containing cyclopentanylvinylene units. 4,022,954, Cl. 526-15.000.

Kuschel, Konrad, to IFE Gesellschaft mbH. Method and apparatus for weighing batches of liquid and other pourable substances. 4,023,021, Cl. 235-151.330.

Kutsuwa, Yoshikazu: *See—*
Sawa, Shigeki; Anbo, Takeshi; Otani, Kiyoshi; and Kutsuwa, Yoshikazu, 4,022,701.

Kuwahara, Hiroshi: *See—*
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Kyrias, Gilbert M., to FMC Corporation. Gas transmitting body for use in bubble shearing. 4,022,854, Cl. 261-122.000.

Kyuroku Kabushiki-Kaisha: *See—*
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Labor Muszeripari Muvek of Esztergom: *See—*
Muranyi, Istvan; and Harsanyi, Gyorgy, 4,022,067.

Lacoste, Francois Rene; and Warnery, Jean Marc, to Patentex S.A.; and Ciba-Geigy AG. Tennis ball. 4,022,469, Cl. 273-61.00C.

Ladd, Floyd R.: *See—*
Schulze, Robert R.; and Ladd, Floyd R., 4,022,214.

Ladisch, Gerhard, to Pfrengle, Otto. Process for reacting acid and base. 4,022,379, Cl. 239-8.000.

Lafayette Pharmacal, Inc.: *See—*
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Lafferty, Gary S., Sr., to Milwaukee Electric Tool Corporation. Locking member for hand-held trigger actuated switch. 4,023,001, Cl. 200-157.000.

La Force, Phil D.: *See—*
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L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
Brugerolle, Jean Renaud, 4,022,030.

Lambert, Charles F., Jr., to Clayton & Lambert Manufacturing Co. Spreading-unloading rotary sweep apparatus of the hole-forming sleeve type. 4,022,335, Cl. 214-17.0CB.

Lamberti, Vincent: *See—*
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Lamensdorf, David; and Nicolson, Alexander Murray, to Sperry Rand Corporation. Borehole telemetry system. 4,023,136, Cl. 340-18.0NC.

Lancini, Giancarlo: *See—*
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Landplane, Marvin: *See—*
Rocksvold, Alvin N., 4,022,490.

Lane, Michael Stephen: *See—*
Braun, Edwin Julius; Lane, Michael Stephen; Meise, Henry August, Jr.; and Taylor, George William, 4,022,983.

Langen & Co.: *See—*
Strauff, Gunther, 4,022,110.

Langenfeld, Wilhelm; and Stelzner, Klaus, to Didier-Werke AG. Converter bottom structure. 4,022,445, Cl. 266-224.000.

Laprada, Xavier: *See—*
Laprade, Bernard; Laprada, Xavier; and Gele, Pierre, 4,022,171.

Laprade, Bernard; Laprada, Xavier; and Gele, Pierre. Process and device for controlling an electric valve for regulating the supply of the fuel air mixture to internal combustion engines. 4,022,171, Cl. 123-119.0EC.

Laprade, Bernard; Laprade, Xavier; and Gele, Pierre, to Les Usines Laprade; and Societe Nationale des Petroles d'Aquitaine. Carburetor for an internal combustion engine. 4,022,175, Cl. 123-140.0MC.

Laprade, Xavier: *See—*
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Lara, Jose Hector; and Williams, Edward B., Jr. Spark plug. 4,023,058, Cl. 313-139.000.

Larkins, Frank D.; and Anderson, Bruce D. Apparatus for laying pressure sensitive tape from a tape roll. 4,022,651, Cl. 156-577.000.

Larkins, Thomas H., Jr.: *See—*
Newland, Gordon C.; Irick, Gether, Jr.; and Larkins, Thomas H., Jr., 4,022,632.

Lassig, Harry, to Fordertechnik Hamburg Harry Lassig, Firma. Apparatus for stacking sacks onto pallets. 4,022,334, Cl. 214-6.00P.

La Tour, Diane Jean, to General Foods Corporation. Coffee-like beverage and process therefor. 4,022,916, Cl. 426-285.000.

Lau, Edward H.; and Chu, Mosi, to Redactron Corporation. Ribbon lifting mechanism. 4,022,313, Cl. 197-167.000.

Lauener, Wilhelm Friedrich, to Rollcast S.A. Method of rolling ingots into metal strips. 4,022,041, Cl. 72-15.000.

Laufer, Siegmar; and Roy, Waldemar, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Apparatus for making particulate materials, particularly oxides, hydrophobic. 4,022,152, Cl. 118-49.500.

Laukien, Gunther R. Apparatus for measuring the frequency of cardiac pulses. 4,022,192, Cl. 128-2.06F.

Laursen, Milton P. Conveyor loader device. 4,022,338, Cl. 214-89.000.

Lautenschlager, Karl, to Karl Lautenschlager KG Mobelbeschlagfabrik. Hinge housing for furniture pieces. 4,021,881, Cl. 16-159.000.

Lawrence Peska Associates, Inc.: *See—*
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Houlf, Harold A., 4,022,412.

Leach, Bruce E., to Continental Oil Company. Liquid phase methylation of ortho cresol. 4,022,843, Cl. 260-621.00R.

Leahy, William F. Bicycle fairing and bracket therefor. 4,022,487, Cl. 280-289.00S.

LeBoeuf, Albert R.; and Grovesteen, William R., to Warner-Lambert Company. Dimensionally stable shaped eye bandages. 4,022,204, Cl. 128-163.000.

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Lee, Cyril Arthur, to EMI Limited. Magnetic recording. 4,023,204, Cl. 360-56.000.
Lee, David Q.: *See*—
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Lee, Hong H., to Westvaco Corporation. Process for separating soap from black liquor. 4,022,653, Cl. 162-16.000.
Lee, John Derek, to BICC Ltd. Wire enamelling machinery and the use thereof. 4,022,933, Cl. 427-117.000.
Lee, Ta-Jyh: *See*—
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Lehureau, Jean Claude: *See*—
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Leibowitz, Lawrence M.; and Watkins, Phillip L., to United States of America, Navy. Automatic scaled digital integrator. 4,023,019, Cl. 235-150.510.
Leibundgut, Gottfried; and Joerg, Rene, to Scintilla A.G. Guide handle for power tools. 4,021,914, Cl. 30-392.000.
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Lemercier, Guy, to Commissariat a l'Energie Atomique. Device for the thermal protection of a fast reactor vessel. 4,022,657, Cl. 176-40.000.
Lenkevich, Steve T. Dust and water confinement unit for portable circular saw. 4,022,182, Cl. 125-13.00R.
Lentz, George Howard; and Slade, Richard Palmer, to Bell Telephone Laboratories, Incorporated. Fault locating apparatus for digital transmission system. 4,022,988, Cl. 179-175.31R.
L'Eplattenier, Francois; Pugin, Andre; and von der Crone, Jost, to Ciba-Geigy Corporation. Metal complexes of azomethines and process for their manufacture. 4,022,770, Cl. 260-240.00G.
Lerner, Bernard J. Mist elimination. 4,022,593, Cl. 55-90.000.
Leroux, Marcel Henri: *See*—
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Les Usines Laprade: *See*—
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Lester, Dozier. Frog feeding apparatus. 4,022,160, Cl. 119-51.00R.
Lestradet, Maurice C. J. Wheeled vehicle with controlled-output spreader system. 4,023,020, Cl. 235-151.200.
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Bukhman, Aron Borukhovich; Yanushkevich, Igor Lvovich; Kalashnikov, Vadim Dmitrievich; Levitina, Marina Isaakovna; Rozenberg, Jury Borisovich; Elkin, Vladimir Valentinovich; and Ponomareva, Elena Mikhailovna, 4,023,177.
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Lienemann, Ernst, to VEB Nahmaschinenwerk Wittenberge. Looper drive device for a stitching machine. 4,022,140, Cl. 112-199.000.
Lieser, Karl Heinrich; and Burba, Peter, to Riedel-de Haen Aktiengesellschaft. Ion exchanger on the basis of cellulose and process for its manufacture. 4,022,964, Cl. 536-43.000.
Lighting Systems, Inc.: *See*—
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Likas, Richard J. Guard frame for bicycle tandem child seat. 4,022,488, Cl. 280-289.00A.
Lindberg, Frank A., to United States of America, Navy. Method for making beam leads for ceramic substrates. 4,022,641, Cl. 156-650.000.
Lindblom, K. Julius; and Kipping, Anders S. E., to Automatisk Doserings Kompensator AB. Lateral truck movement control system. 4,022,133, Cl. 105-157.00R.
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Loftus, William F. Apparatus for and process of determining the internal diameter of pipelines. 4,021,925, Cl. 33-178.00E.
Lohmar, Elmar; Gehrmann, Klaus; Ohorodnik, Alexander; and Stutzke, Paul, to Hoechst Aktiengesellschaft. Production of beta-halogenoformyl-ethyl phosphinic acid halides. 4,022,826, Cl. 260-543.00P.
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Lonati, Francesco. Panty hose waist opening. 4,022,035, Cl. 66-177.000.
Long, John V.; and Cremer, George D., to International Harvester Company. Compliant structural members. 4,022,481, Cl. 277-96.100.
Long, Peter Graham, to Colchester Lathe Company Limited, The. Gating circuit. 4,023,077, Cl. 361-187.000.
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Louthan, Rector P.; and Kubicek, Donald H., to Phillips Petroleum Company. Corrosion-resistant reactor suitable for high temperature/high pressure operation. 4,022,582, Cl. 23-290.000.
Louzil, Friedrich, to U.S. Philips Corporation. Container for a record carrier. 4,022,322, Cl. 206-387.000.
Lovison, Paula J. Hygienic garment assembly. 4,022,212, Cl. 128-288.000.
Lowdenslager, John R., to Timex Corporation. Combination wristwatch/chronograph/wrist calculator/measuring device. 4,022,014, Cl. 58-23.00R.
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Lucas, Frederic C., Jr. Adjustable locking device for pants hangers and skirt hangers. 4,022,360, Cl. 223-96.000.
Lucas, Richard L.; and Gute, Robert M., to Midland-Ross Corporation. Switch mechanism for bus doors with manually operated touch bar. 4,022,996, Cl. 200-61.430.
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Mainprice, Peggy L. Scoop device. 4,021,994, Cl. 53-390.000.
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Malott, Theodore A., to Clark Equipment Company. Shift control mechanism. 4,022,078, Cl. 74-475.000.
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Marshall, Richard M., to Raytheon Company. High power low loss nonresonant filter system. 4,023,166, Cl. 343-5.00R.
Martin, Charles F. Submarine pipe trenching apparatus. 4,022,028, Cl. 61-72.400.
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Mathias, Robert G., to Hammond Corporation. Voltage controlled filter. 4,023,113, Cl. 330-107.000.
Mathison, Ian William, to Marion Laboratories, Inc. Compositions containing 1,2,3,4-tetrahydroisoquinolines used as hypotensive agents. 4,022,900, Cl. 424-258.000.
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Maxwell, Oscar Benton, Jr. Convertible cradle. 4,021,867, Cl. 5-106.000.
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McBride, Donald W.; Glenn, Richard L.; and Cooper, Barry A., to Hallmark Cards, Incorporated. Method of molding an article in an expansible mold and removing the article from the mold. 4,022,862, Cl. 264-271.000.
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McCrory, Charles Francis. Electrical circuit for audio services. 4,023,070, Cl. 361-43.000.

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McLarty, Gordon. Air circulating fan and motor with separable safety guard. 4,022,548, Cl. 416-247.00R.

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Medler, Albert, to Plastigage Corporation. Method of forming glass fiber construction member. 4,022,864, Cl. 264-257.000.

Meedom, Halvor, to F. L. Smidth & Co. Method and apparatus for heat treating pulverous raw materials. 4,022,568, Cl. 432-14.000.

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Remy, David C., 4,022,902.
Smith, Robert L.; Lee, Ta-Jyh; and Cragoe, Edward J., Jr., 4,022,794.

Merkle, Paul. Intermediate levers for safety cut-out switch with lock. 4,022,995, Cl. 200-44.000.

Mesaros, Louis: *See—*
Mollard, Paul; and Mesaros, Louis, 4,022,874.

Metz, Joseph R., to Norco, Inc. Anti-backlash automatically reversing nut for a diamond thread screw. 4,022,076, Cl. 74-441.000.

Meyer, Glenn A., to Hittman Corporation. Apparatus for sensing pressure. 4,022,190, Cl. 128-2.00A.

Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, to Bayer Aktiengesellschaft. 2-Amino-4-pyrimidyl-1,4-dihydropyridine derivatives. 4,022,898, Cl. 424-251.000.

Meyer, Roy E.; and Stuart, Jerry E., to Wahl Clipper Corporation. Combined massage and spot heating device. 4,022,195, Cl. 128-24.200.

Meyer, Wolfgang: *See—*
Kirschner, Horst; and Meyer, Wolfgang, 4,021,920.

MFE Corporation: *See—*
Stillman, Stephen L., Jr., 4,023,184.

Mich, Thomas Frederick: *See—*
Tinney, Francis John; Nicolaides, Ernest D.; Hutt, Marland Paul; and Mich, Thomas Frederick, 4,022,761.

Michne, William F.: *See—*
Albertson, Noel F.; and Michne, William F., 4,022,792.

Micromedic Systems, Inc.: *See—*
Revillet, Georges; Sanz, Manuel C.; and Nicole, Andre, 4,022,579.

Middleton, Verne L.: *See—*
Kleine, Charles A.; and Middleton, Verne L., 4,021,901.

Midland-Ross Corporation: *See—*
Bulanchuk, William J., 4,022,967.
Lucas, Richard L.; and Gute, Robert M., 4,022,996.
Russ, Stephen J.; and Beke, Zoltan, 4,021,931.

Migliardi, Gianfranco; and Cavicchioli, Ugo, to Digital Electronic Automation. Omnidirectional electronic probe for measuring machines. 4,023,045, Cl. 307-119.000.

Miki, Masayuki: *See—*
Miyakawa, Nobuaki; and Miki, Masayuki, 4,023,159.

Mikos, Aloysius J., to Chicago Lock Co. Key ejector lock. 4,022,039, Cl. 70-388.000.

Miles Laboratories, Inc.: *See—*
Gardiner, Phillip J.; and Schneider, Cyril, 4,022,912.

Miller, Albert J., to Engineering Systems Corporation. Magnetically operated locking device and key. 4,022,038, Cl. 70-276.000.

Miller, Albert J., to Engineering Systems Corporation. Theft alarm for portable articles. 4,023,157, Cl. 340-280.000.

Miller-Andersson, Maggie: *See—*
Andersson, Lars-Olov; Borg, Hakan Gunnar; Forsman, Nanna; Hanshoff, Gunnar; Lindroos, Goran; Miller-Andersson, Maggie; and Carling nee Ehrenberg, Elisabeth Charlotte, 4,022,758.

Miller, Bernard, to Houston, Chester O., Jr., a part interest. Transmission fluid heat radiator. 4,022,272, Cl. 165-51.000.

Miller, G. Kirby, to GTE Sylvania Incorporated. Ultrasonic tape intrusion detection system. 4,023,155, Cl. 340-258.00A.

Miller, Kenneth J.: *See—*
Davis, Billy J.; Dawson, Harry J.; Mangus, Ervin E.; and Miller, Kenneth J., 4,022,050.

Miller, Leroy J., to Hughes Aircraft Company. Means for inducing perpendicular alignment of a nematic liquid crystal on a coated substrate. 4,022,934, Cl. 427-126.000.

Miller, Michael Robert: *See—*
Duerdoth, Winston Theodore; Brown, Christopher Anthony; Miller, Michael Robert; and Potter, Arthur Robin, 4,023,145.

Miller, Robert C., to Nabisco, Inc. Method for producing irregularly shaped expanded food products. 4,022,918, Cl. 426-446.000.

Miller, Robert C.; and Mallick, George T., Jr., to Westinghouse Electric Corporation. Automatic machine tool including a monitoring system. 4,023,044, Cl. 307-116.000.

Miller, Robert E.; and Brockett, Bruce W., to NCR Corporation. Record material. 4,022,936, Cl. 427-151.000.

Millonzi, Richard Phillip: *See—*
Bergfjord, John Alf; Radler, Richard William; and Millonzi, Richard Phillip, 4,022,956.

Milne, George M., Jr.: *See—*
Hammen, Philip D.; and Milne, George M., Jr., 4,022,836.

Milwaukee Electric Tool Corporation: *See—*
Lafferty, Gary S., Sr., 4,023,001.

Mima, Seiichi; and Miya, Masaru, to Agency of Industrial Science & Technology. Polymers with high transparency and refractive index and process for production thereof. 4,022,960, Cl. 526-240.000.

Miner, Earl L., to Detroit Tool & Engineering Co. Brush assembly for vehicle wash apparatus. 4,021,877, Cl. 15-53.00A.

Minka, Karlis. Dental floss holder. 4,022,229, Cl. 132-92.00R.

Minnesota Mining and Manufacturing Company: *See—*
Taylor, Allen L., 4,023,054.

Minolta Camera Kabushiki Kaisha: *See—*
Ueda, Hiroshi; and Matsuda, Motonobu, 4,023,188.

Miram, George Valentine: *See—*
Berwick, Albert Edward; and Miram, George Valentine, 4,023,061.

Mitchell, John: *See—*
Queen, David S.; and Mitchell, John, 4,022,087.

Mitchell, William Alexander; and Seidel, William Charles, to General Foods Corporation. Dry acidulents. 4,022,924, Cl. 426-650.000.

Mitsubishi Chemical Industries Ltd.: *See—*
Ashida, Kaneyoshi, 4,022,721.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Arakane, Kenjiro, 4,023,089.
Ishida, Yotsuo; and Kuwahara, Hiroshi, 4,023,076.
Nomura, Jutaro, 4,022,977.

Mitsubishi Gas Chemical Company, Inc.: *See—*
Tanigaichi, Mineaki; Motoori, Susumu; and Noguchi, Kazuo, 4,022,755.

Mitsubishi Kasei Kogyo Kabushiki Kaisha: *See—*
Shishido, Nobuyuki; Muramatsu, Kazutami; Moriya, Kikuo; and Yasuda, Seiiti, 4,022,438.

Mitsugi, Koji; Kobayashi, Nobuo; Shida, Toshiro; and Yokokawa, Yasunori, to Ajinomoto Co., Inc. Alpha-amylases from *Bacillus subtilis*. 4,022,666, Cl. 195-62.000.

Mitsui Mining & Smelting Co., Ltd.: *See*—
Mukae, Satoshi; and Yokokawa, Kiyosi, 4,023,022.
Mitsui Polychemicals, Co., Ltd.: *See*—
Sawa, Shigeki; Anbo, Takeshi; Otani, Kiyoshi; and Kutsuwa, Yoshikazu, 4,022,701.
Miya, Masaru: *See*—
Mima, Seiichi; and Miya, Masaru, 4,022,960.
Miyadera, Tetsuo: *See*—
Tachikawa, Ryuji; Miyadera, Tetsuo; Terada, Atsusuke; Kamioka, Toshiharu; and Naruto, Syunji, 4,022,832.
Miyahara, Kingo, to Dowa Co., Ltd. Burner for burning liquid fuel in gasified form. 4,022,567, Cl. 431-168.000.
Miyakawa, Nobuaki; and Miki, Masayuki, to Hitachi, Ltd. Non-linear analogue-digital converter. 4,023,159, Cl. 340-347.0AD.
Miyamoto, Akio; and Matsukawa, Hiroharu, to Fuji Photo Film Co., Ltd. Desensitizer composition. 4,022,624, Cl. 106-2.000.
Miyashita, Masahiko: *See*—
Tsujino, Yoshiaki; Miyashita, Masahiko; and Hashimoto, Tokio, 4,022,822.
Miyoshi, Mituji: *See*—
Matsuura, Kazuo; Kuroda, Nobuyuki; Nakamura, Toru; and Miyoshi, Mituji, 4,022,958.
Mizuno, Toshio: *See*—
Yoshimura, Tatsushiro; Suzue, Seisuke; Tominaga, Shigetake; Namba, Mutsusuke; and Mizuno, Toshio, 4,022,742.
MOACO Metal Oxide Acylates Company: *See*—
Rinse, Jacobus, 4,022,725.
Mobil Oil Corporation: *See*—
Cavanna, Anthony John; and Colombo, Edward Armando, 4,022,858.
Dessau, Ralph M., 4,022,588.
Herrington, F. John, 4,022,558.
Moench, Jerry D.: *See*—
Bormann, Alan R.; Martino, William L.; and Moench, Jerry D., 4,023,149.
Mogavero, Robert: *See*—
Gaouditz, Nicolas; Le Borgne, Edouard; and Mogavero, Robert, 4,022,655.
Mohrbacher, Richard J.; and Grous, Philip P., to McNeil Laboratories, Incorporated. 2-Aminobenzodiazepine-5-ones. 4,022,767, Cl. 260-239.30D.
Mollard, Paul; and Mesaros, Louis, to Produits Chimiques Ugine Kuhlmann. Process for the production of sodium percarbonate. 4,022,874, Cl. 423-415.00P.
Moltner, Hermann: *See*—
Gerhards, Hans Dieter; and Moltner, Hermann, 4,022,049.
Monahan, Brian J. Electronic temperature controller and switching device. 4,022,271, Cl. 165-12.000.
Monroe, Orville: *See*—
Felder, Donald Wayne; Felder, Ralph; and Monroe, Orville, 4,022,430.
Monsanto Company: *See*—
Anderson, George J.; and Culbertson, Harry M., 4,022,942.
Chapman, Richard D.; Holmer, Donald A.; Pickett, Oscar A., Jr.; and Saunders, James H., 4,022,756.
Johnson, Anders A., 4,022,820.
Peng, Fred M.; and Dalton, William O., 4,022,733.
Montagna, Angelo A.: *See*—
Black, Edgar R.; Montagna, Angelo A.; and Swift, Harold E., 4,022,684.
Montagnino, Lucian, to Perkin-Elmer Corporation, The. Sample point interferometric system for optical figure monitoring. 4,022,532, Cl. 356-109.000.
Montan - Castell A.G.: *See*—
Fioretto, Mauro, 4,022,859.
Montedison Fibre S.p.A.: *See*—
D'Achille, Massimo; and Bucci, Mario, 4,022,744.
Moody, Mary B. Preparation of yogurt. 4,022,914, Cl. 426-43.000.
Moore, Hermus C., Jr.: *See*—
Busse, Ralph; Moore, Hermus C., Jr.; and Welch, Raymond L., 4,021,978.
Moore, Phil D. Tire fence. 4,022,434, Cl. 256-1.000.
Moppett, Charles E.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,022,885.
Morduchowitz, Abraham; and Bialy, Jerzy Jozef, to Texaco Inc. Low pour waxy residual fuel oils. 4,022,590, Cl. 44-80.000.
Morgan Construction Company: *See*—
Salter, Lowell S., Jr., 4,022,480.
Morgan, Howard William, Jr., to Filter Specialists, Inc. Liquid filter having multiple filtering elements. 4,022,693, Cl. 210-345.000.
Morgan, Marvel B. Tool for removing plant growth from peripheral zones of sprinkler heads. 4,022,283, Cl. 172-15.000.
Morgan, Paul M.: *See*—
Siems, Lee E.; and Morgan, Paul M., 4,023,140.
Mori, Yoshinori: *See*—
Kondo, Toshio; Mori, Yoshinori; and Ishikawa, Masakazu, 4,022,303.
Morie, Gerald P.; and Sloan, Cephas H., to Eastman Kodak Company. Water and glycol bonding dispersions for synthetic fibers. 4,022,740, Cl. 260-29.20E.
Morimoto, Toshio, to Matsushita Electric Industrial Co., Ltd. Container for magnetic tape. 4,022,402, Cl. 242-199.000.
Morisaki, Masuo: *See*—
Takeshita, Toru; Hashimoto, Yoshinobu; Kawashima, Hiroyuki; Ishimoto, Sachio; Ikekawa, Nobuo; and Morisaki, Masuo, 4,022,891.
Morita, Tamao, to Application Art Laboratories Co., Ltd. Magnetic lock closure. 4,021,891, Cl. 24-201.00B.
Moriya, Kikuo: *See*—
Shishido, Nobuyuki; Muramatsu, Kazutami; Moriya, Kikuo; and Yasuda, Seiiti, 4,022,438.
Morris, David A.: *See*—
Flournoy, Norman E.; Morris, David A.; and Agnew, Robert J., 4,022,055.
Morris, Sidney John: *See*—
Poole, Eric John; and Morris, Sidney John, 4,022,553.
Morse, Roger Neill; and Davey, Edward Thomas, to Commonwealth Scientific and Industrial Research Organization. Solar heating. 4,021,895, Cl. 126-271.000.
Mort, Charles F.: *See*—
Horst, William R.; Mort, Charles F.; and Hale, William J., 4,023,010.
Mortensen, Helge H., to National Semiconductor Corporation. Current limiting driver circuit. 4,023,111, Cl. 330-28.000.
Morton-Norwich Products, Inc.: *See*—
Pelosi, Stanford S., Jr., 4,022,798.
Mosakowski, Thomas S.: *See*—
Grubb, Albany D.; Mosakowski, Thomas S.; and Trumbly, Terry A., 4,022,947.
Mosch, Alfred. Foldable warning device. 4,021,948, Cl. 40-129.00C.
Moseman, Lynn R.: *See*—
Brewer, Lloyd A.; and Moseman, Lynn R., 4,022,077.
Moser, Kurt; Weigele, Reinhold; and Pfeil, Wolfgang, to Develop KG/Dr. Eisbein and Co. Pressing installation for a copying arrangement. 4,022,122, Cl. 100-158.00R.
Moskvina, Ljudmila Dmitrievna: *See*—
Garkusha, Anatoly Viktorovich; Shnee, Yakov Isidorovich; Ponkratova, Anna Grigorievna; Sukhinin, Viktor Pavlovich; Arkadiev, Boris Abramovich; and Moskvina, Ljudmila Dmitrievna, 4,022,544.
Mossey, John G.: *See*—
Davis, Donald H.; and Mossey, John G., 4,022,424.
Motobayashi, Kozo; and Kamiya, Kazuo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Cooling means for ringless spinning frame. 4,022,007, Cl. 57-58.950.
Motoori, Susumu: *See*—
Tanigaichi, Mineaki; Motoori, Susumu; and Noguchi, Kazuo, 4,022,755.
Motorola, Inc.: *See*—
Black, James R.; and Philofsky, Elliott M., 4,022,931.
Bormann, Alan R.; Martino, William L.; and Moench, Jerry D., 4,023,149.
Malone, Hugh R.; Matson, Michael L.; and Ziegner, Bernhard A., 4,023,198.
Moyer, John H. Treatment for hypertension. 4,022,893, Cl. 424-246.000.
Muenstermann, Walter J., to Raymond Lee Organization, Inc., The, a part interest. Tension curler. 4,022,226, Cl. 132-39.000.
Mukae, Satoshi; and Yokokawa, Kiyosi, to Mitsui Mining & Smelting Co., Ltd. System for automatically and continuously measuring zinc and sulfuric acid concentration in circulating electrolyte. 4,023,022, Cl. 235-151.350.
Mulder, Garvin; Machiela, Norman; and Saunders, George T., to ODL, Incorporated. Door light fastener. 4,021,967, Cl. 49-171.000.
Muller, Gerald: *See*—
Gladenbeck, Jurgen; and Muller, Gerald, 4,022,010.
Muller, Johann, to Albert Handtmann, Firma. Method of and apparatus for making link sausages. 4,021,885, Cl. 17-33.000.
Mune, Charles, to Heinemann Electric Company. Circuit breaker with contacts which are not engageable when the electrical sensing unit thereof is energized. 4,023,127, Cl. 335-172.000.
Munn, Robert E.: *See*—
Louie, Anthony C. H.; and Munn, Robert E., 4,023,202.
Murakami, Fumikazu, to Kabushiki Kaisha Daini Seikosha. Electronic buzzer. 4,023,162, Cl. 340-384.00E.
Muramatsu, Kazutami: *See*—
Shishido, Nobuyuki; Muramatsu, Kazutami; Moriya, Kikuo; and Yasuda, Seiiti, 4,022,438.
Muranyi, Istvan; and Harsanyi, Gyorgy, to Labor Muszeripari Muvek of Esztergom. Rapid-action automatic sampling apparatus. 4,022,067, Cl. 73-423.00A.
Murphy, Alan Pearce: *See*—
Zaki, Wahib Nassif; and Murphy, Alan Pearce, 4,022,938.
Murphy, Edward Patrick. Gate stop. 4,021,880, Cl. 16-82.000.
Murray, Edward Conley, to Kerr-McGee Chemical Corporation. Titanium dioxide pigment and process for making same. 4,022,636, Cl. 106-300.000.
Murray, James A.: *See*—
Garrett, Hoke M.; and Murray, James A., 4,022,629.
Murray, James E.; and Resch, Robert J., to Cyberex Incorporated. Plural motor drive system. 4,023,081, Cl. 318-109.000.
Murray, Robert L.; Leininger, Donald L.; and Polson, Charles L., to Dover Corporation. Liquid dispensing nozzle having a flexible retaining arrangement. 4,022,235, Cl. 137-38.000.
Muskin Corporation: *See*—
Smith, Clarence G., 4,022,690.

Muta, Susumu: *See*—
Okuyama, Toru; Muta, Susumu; Kurahashi, Suminobu; and Sato, Shigetake, 4,022,719.

Muto, Makoto: *See*—
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, 4,022,605.

Mutoh, Fumio; Koizumi, Hiroshi; Yamasaki, Jun; and Ando, Toshifumi. Apparatus for freezing cooked rice. 4,022,600, Cl. 62-381.000.

Myrick, James E.; and Hall, Leo M., to University of Alabama, The. Substrate solution for carboxylic ester hydrolase determination. 4,022,667, Cl. 195-103.50R.

N.P.I. Corporation: *See*—
Brown, John S., 4,023,007.

Nabisco, Inc.: *See*—
Miller, Robert C., 4,022,918.

Nabiullin, Faat Khatovich. Air-depolarized cell. 4,022,949, Cl. 429-28.000.

Nagai, Akio: *See*—
Tanaka, Minoru; Tanaka, Yoshio; and Nagai, Akio, 4,022,169.

Nagano, Hiroyuki: *See*—
Matsunaga, Isao; Ochi, Kiyoshige; Nagano, Hiroyuki; Shindo, Minoru; Ishikawa, Masayuki; Kaneko, Chikara; and DeLuca, Hector F., 4,022,768.

Nagashima, Takashi: *See*—
Kondo, Toshiyuki; and Nagashima, Takashi, 4,022,514.

Najmann, Knut: *See*—
Heuber, Klaus; Klein, Wilfried; Najmann, Knut; and Wiedmann, Siegfried K., 4,023,148.

Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, to Otsuka Pharmaceutical Company Limited. 5-[1-Hydroxy-2-(substituted-amino)]ethyl-8-hydroxycarbostyril derivatives. 4,022,776, Cl. 260-247.20A.

Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamara, Shigeharu, to Otsuka Pharmaceutical Company Limited. 5-[1-Hydroxy-2-(substituted-amino)]alkyl-8-substituted-carbostyril and -3,4-dihydrocarbostyril derivatives. 4,022,784, Cl. 260-288.00R.

Nakagome, Keisuke; and Suzuki, Toshiharu, to Nitto Electric Industrial Co., Ltd. Method for producing metal laminates containing an interlayer of thermally stable heterocyclic polymer. 4,022,649, Cl. 156-309.000.

Nakajima, Shunichi; Kobayashi, Nobuo; and Ariga, Yoshio, to Tokyo Shibaura Electric Co., Ltd. Automatic bank note depositing machine. 4,023,011, Cl. 235-61.11R.

Nakamura, Toru: *See*—
Matsuura, Kazuo; Kuroda, Nobuyuki; Nakamura, Toru; and Miyoshi, Mituji, 4,022,958.

Nakanishi Dental Mfg., Co., Ltd.: *See*—
Nakanishi, Toshimasa, 4,021,917.

Nakanishi, Toshimasa, to Nakanishi Dental Mfg., Co., Ltd. Dental handpiece and a cartridge for a head thereof. 4,021,917, Cl. 32-27.000.

Nakazawa, Hajime: *See*—
Arakatsu, Akira; Nakazawa, Hajime; and Naruse, Hiroshi, 4,022,686.

Nakazyo, Kiyoshi: *See*—
Okumura, Akio; Sugizaki, Atsushi; Ichijima, Seiji; Shiba, Keisuke; and Nakazyo, Kiyoshi, 4,022,620.

Nalco Chemical Company: *See*—
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,022,741.

Namba, Mutsusuke: *See*—
Yoshimura, Tatsushiro; Suzue, Seisuke; Tominaga, Shigetake; Namba, Mutsusuke; and Mizuno, Toshio, 4,022,742.

Narayanan, Venkatachala L.; Jacobs, Glenn Anthony; and Haugwitz, Rudiger D., to E. R. Squibb & Sons, Inc. Isothiocyanobenzoxazoles. 4,022,781, Cl. 260-268.0BC.

Narayanan, Venkatachala L.; Gadebusch, Hans H.; and Haugwitz, Rudiger D., to E. R. Squibb & Sons, Inc. 3-Pyridinyl-5-isothiocyanophenyl oxadiazoles. 4,022,901, Cl. 424-263.000.

Narda Microwave Corporation, The: *See*—
Aslan, Edward E., 4,023,093.

Naruse, Hiroshi: *See*—
Arakatsu, Akira; Nakazawa, Hajime; and Naruse, Hiroshi, 4,022,686.

Naruto, Syunji: *See*—
Tachikawa, Ryuji; Miyadera, Tetsuo; Terada, Atsusuke; Kamioka, Toshiharu; and Naruto, Syunji, 4,022,832.

Nashua Corporation: *See*—
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Nasiadka, Anthony F.: *See*—
Wells, James E., III; and Nasiadka, Anthony F., 4,022,615.

Nasser, Frederick F.: *See*—
Newsome, John R.; Polarek, Kenneth; and Nasser, Frederick F., 4,022,455.

National Can Corporation: *See*—
Zukerman, Harold, 4,022,915.

National Manufacturing Company: *See*—
Edeus, James A.; and Johnston, James R., 4,021,988.

National Semiconductor Corporation: *See*—
Mortensen, Helge H., 4,023,111.

National Steel Corporation: *See*—
Benton, Charles M.; Cox, Paul, Jr.; Sprinkle, Paul M.; and Nowak, Frank John, 4,021,905.

NCR Corporation: *See*—
Farber, Sheldon, 4,022,771.
Horst, William R.; Mort, Charles F.; and Hale, William J., 4,023,010.
Krull, Felix B., 4,022,311.
Miller, Robert E.; and Brockett, Bruce W., 4,022,936.

Neeld, Gregory Patrick; and Neeld, Norman George. Face mask. 4,021,858, Cl. 2-9.000.

Neeld, Norman George: *See*—
Neeld, Gregory Patrick; and Neeld, Norman George, 4,021,858.

Nehring, John R., to International Paper Company. Resilient self-contained fluid evacuator. 4,022,209, Cl. 128-278.000.

Nelson, Philip E., to Purdue Research Foundation. Method and apparatus for aseptic bulk storage of apple sauce. 4,022,922, Cl. 426-638.000.

Nelson, Roy G.: *See*—
Smith, William E.; and Nelson, Roy G., 4,022,948.

Nelson, William J.: *See*—
Sutthoff, Robert F.; and Nelson, William J., 4,022,637.

Neri, Carlo; and Cipriani, Gioacchino, to ANIC, S.p.A. Method for the preparation of salts of carbonic acid monoesters. 4,022,813, Cl. 260-463.000.

Netravali, Arun Narayan; and Rubinstein, Charles Benjamin, to Bell Telephone Laboratories, Incorporated. Method and apparatus for encoding color video signals. 4,023,199, Cl. 358-13.000.

Neuroth, Norbert: *See*—
Deutschbein, Otto; Faulstich, Marga; Neuroth, Norbert; and Jahn, Walter, 4,022,707.

Newland, Gordon C.; Irick, Gether, Jr.; and Larkins, Thomas H., Jr., to Eastman Kodak Company. Decreasing the photosensitivity of titanium IV dioxide. 4,022,632, Cl. 106-193.00J.

Newmark, Harold Leon, to Hoffmann-La Roche Inc. High potency vitamin A compositions. 4,022,913, Cl. 424-344.000.

Newsome, John R.; Polarek, Kenneth; and Nasser, Frederick F., to World Color Press, Inc. Demographic assembling and addressing machine for magazines and the like. 4,022,455, Cl. 270-54.000.

Newton, Barry N., to Lafayette Pharmacal, Inc. Iodine containing organic carbonates for use as radiographic agents. 4,022,814, Cl. 260-463.000.

Nguyen, Anh D.: *See*—
Karass, Thomas J.; Nguyen, Anh D.; and Vegvari, Paul, 4,022,863.

Nibco, Inc.: *See*—
Edwards, Robert B., 4,022,243.

Nicolaides, Ernest D.: *See*—
Tinney, Francis John; Nicolaides, Ernest D.; Hutt, Marland Paul; and Mich, Thomas Frederick, 4,022,761.

Nicolas, Michel Jacques Robert, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Means for controlling the phase or frequency output of an oscillator in a loop circuit. 4,023,115, Cl. 331-17.000.

Nicole, Andre: *See*—
Revillet, Georges; Sanz, Manuel C.; and Nicole, Andre, 4,022,579.

Nicolson, Alexander Murray: *See*—
Lamensdorf, David; and Nicolson, Alexander Murray, 4,023,136.

Niehaus, Donald H.; Schwab, Nick J.; and Seggerson, Patrick J., to American Sign and Advertising Services, Inc. Illuminated sign system. 4,021,949, Cl. 40-132.00R.

Nielsen, Ralph R.: *See*—
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., 4,022,741.

Nielson, William W., to Flexible Plastics Corporation. Parison slicer for plastic molding machines. 4,022,559, Cl. 425-184.000.

Nifco Inc.: *See*—
Kurosaki, Mutsuo, 4,021,890.

Nihon Nohyaku Co. Ltd.: *See*—
Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, 4,022,907.

Nill, Eberhard; and Schmidt, Peter, to International Standard Electric Corporation. Method of aluminizing the inside of the panel of a television picture tube. 4,022,929, Cl. 427-69.000.

Nilles, John D.: *See*—
Hansen, Charles C., III; Nilles, John D.; and Kivioja, Olaf E., 4,022,114.

Nippon Electric Company, Ltd.: *See*—
Oura, Toshio, 4,023,122.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Tsujino, Yoshiaki; Miyashita, Masahiko; and Hashimoto, Tokio, 4,022,822.

Nippon Oil Company Ltd.: *See*—
Matsuura, Kazuo; Kuroda, Nobuyuki; Nakamura, Toru; and Miyoshi, Mituji, 4,022,958.

Nippon Soda Company Limited: *See*—
Yoshihara, Hiroshi; Tobita, Takashi; Tomizawa, Ryoichi; and Ishikawa, Kunio, 4,022,808.

Nippon Soken, Inc.: *See*—
Inagaki, Mitsuo; Sasaya, Hideaki; and Kobayashi, Akihiro, 4,022,997.
Yamada, Takashi; and Oishi, Kazuo, 4,023,056.

Nippon Steel Corporation: *See*—
Serizawa, Shizuo; and Sasahira, Seiichi, 4,022,046.
Takahasi, Riyota; Yamada, Takayosi; Kimura, Makoto; and Yosikawa, Seiji, 4,022,265.

Nippon Telegraph and Telephone Public Corporation: *See*—
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Aiba, Masahiko; and Maezawa, Tokio, 4,023,183.

Nishibe, Atsushi; and Kikuchi, Yoshitaka, to Sony Corporation. Humidity sensor. 4,023,206, Cl. 360-75.000.

Nishizawa, Hiroshi; and Fuzishima, Minoru, to Hitachi Chemical

Company, Ltd. Thermosetting coating composition comprising a hydroxy acrylate ester copolymer and N-acylpolylactam or N-acylpolyimide. 4,022,955, Cl. 526-16.000.

Nissan Motor Co., Ltd.: *See—*
Adachi, Masahiro, 4,023,153.

Nitto Electric Industrial Co., Ltd.: *See—*
Nakagome, Keisuke; and Suzuki, Toshiharu, 4,022,649.

Nizel, Abraham E.: *See—*
Harris, Robert S.; and Nizel, Abraham E., 4,022,887.

NL Industries, Inc.: *See—*
Shelton, William A., 4,022,625.

Noack, Manfred G., to Olin Corporation. Catalyzed hydrazine compound corrosion inhibiting composition containing a complex of metal salt and amino derivative of carboxylic acid, and a quinone compound. 4,022,711, Cl. 252-389.00R.

Noack, Manfred G., to Olin Corporation. Catalyzed hydrazine compound corrosion inhibiting composition containing complex of metal salt and amino derivative of carboxylic acid, and its use. 4,022,712, Cl. 252-389.00R.

Nobis, Heinrich: *See—*
Klein, Walter; and Nobis, Heinrich, 4,022,572.

Noble, Terrance O. Apparatus for pumping and dispensing liquid from pharmaceutical bottles. 4,022,347, Cl. 222-1.000.

Noguchi, Kazuo: *See—*
Tanigaichi, Mineaki; Motoori, Susumu; and Noguchi, Kazuo, 4,022,755.

Noland, Richard D., to Air-O-Matics, Inc. Self-cleaning filter arrangement. 4,022,595, Cl. 55-273.000.

Nomura, Jutaro, to Mitsubishi Denki Kabushiki Kaisha. Automatic meter-reading and controlling system. 4,022,977, Cl. 179-2.0AM.

Norco, Inc.: *See—*
Metz, Joseph R., 4,022,076.

Nordentoft, Lars, to ITT Industries, Inc. Pressure compensating device for mixing faucets. 4,022,238, Cl. 137-98.000.

Nordsiek, Karl-Heinz: *See—*
Sommer, Neithart; and Nordsiek, Karl-Heinz, 4,022,959.

Norris, Frank W. Fertilizer and pesticide dispensing stake. 4,021,965, Cl. 47-48.500.

Northrup, Leonard L., Jr. Compound lens solar energy system. 4,022,186, Cl. 126-271.000.

Nott, Clinton W. Refrigeration system. 4,022,032, Cl. 62-499.000.

Nowak, Frank John: *See—*
Benton, Charles M.; Cox, Paul, Jr.; Sprinkle, Paul M.; and Nowak, Frank John, 4,021,905.

Nowy, Gunther: *See—*
Mauz, Otto; Mayer, Norbert; and Nowy, Gunther, 4,022,819.

Nuclear Associates, Inc.: *See—*
Glasser, Herman; and Panetta, Patrick F., 4,021,862.

Numax Electronics Incorporated: *See—*
Schmidt, Charles J., 4,023,172.

N.V. Rubberfabriek Vredestein: *See—*
Bins, Cornelis Geerlof, 4,022,645.

Nyn, Vladimir Semenovich: *See—*
Etingov, Evgeny Davidovich; Bashkovich, Alexandr Pavlovich; Kulbakh, Valter Osvaldovich; Raigorodskaya, Valentina Yakovlevna; Popova, Inessa Vladimirovna; Alexeeva, Ljudmila Evgenievna; Nyn, Vladimir Semenovich; and Lokhina, Nadezhda Dmitrievna, 4,022,886.

O'Brien, Catherine H., executrix: *See—*
O'Brien, Jerry, deceased; and O'Brien, Catherine H., executrix, 4,022,976.

O'Brien, Jerry, deceased; and by O'Brien, Catherine H., executrix. Mechanically-coupled microphone-speaker unit and intercom system. 4,022,976, Cl. 179-1.00H.

Occidental Petroleum Corporation: *See—*
French, Gordon B., 4,022,511.

Ochi, Kiyoshige: *See—*
Matsunaga, Isao; Ochi, Kiyoshige; Nagano, Hiroyuki; Shindo, Minoru; Ishikawa, Masayuki; Kaneko, Chikara; and DeLuca, Hector F., 4,022,768.

O'Connell, Daniel J. Funnel-drainer device. 4,022,257, Cl. 141-98.000.

O'Connor, Joseph; and Illing, Henry, to Kieley & Mueller, Inc. Control valve. 4,022,423, Cl. 251-127.000.

O'Dea, Orrin B., to Communication Mfg. Co. Coin telephone station simulator and condition indicator. 4,022,987, Cl. 179-175.000.

ODL, Incorporated: *See—*
Mulder, Garvin; Machiela, Norman; and Saunders, George T., 4,021,967.

O'Farrell, Francis J., to International Telephone and Telegraph Corporation. Pseudo-random coder with improved near range rejection. 4,023,026, Cl. 235-152.000.

Ogloblin, Ernst Aggeevich: *See—*
Govzman, Boris Izrailevich; and Ogloblin, Ernst Aggeevich, 4,022,425.

Ogura, Hiroshi, to Maruyama Seisakusho Kabushiki Kaisha. Heddle frame for a high speed weaving machine. 4,022,252, Cl. 139-91.000.

Ohorodnik, Alexander: *See—*
Lohmar, Elmar; Gehrmann, Klaus; Ohorodnik, Alexander; and Stutzke, Paul, 4,022,826.

Oishi, Kazuo: *See—*
Yamada, Takashi; and Oishi, Kazuo, 4,023,056.

Oki Electric Industry Company, Ltd.: *See—*
Tanaka, Yoshiaki, 4,022,985.

Okuda, Yoshihiko; Araki, Tsunehiko; and Matsumoto, Shigeru, to Matsushita Electric Works, Ltd. Ionization type smoke sensing device. 4,023,152, Cl. 340-237.00S.

Okui, Seiichi. Welding and cutting apparatus. 4,022,442, Cl. 266-75.000.

Okumura, Akio; Sugizaki, Atsushi; Ichijima, Seiji; Shiba, Keisuke; and Nakazyo, Kiyoshi, to Fuji Photo Film Co., Ltd. Method of forming color photographic images. 4,022,620, Cl. 96-56.200.

Okuyama, Toru; Muta, Susumu; Kurahashi, Suminobu; and Sato, Shigetake, to Bridgestone Tire Company Limited. Process for producing polyamide foam. 4,022,719, Cl. 260-2.50N.

Olin Corporation: *See—*
Kleine, Charles A.; and Middleton, Verne L., 4,021,901.
Noack, Manfred G., 4,022,711.
Noack, Manfred G., 4,022,712.

Olinkraft, Inc.: *See—*
Graser, Earl J., 4,022,372.

Olive, Joseph Philip: *See—*
Kohut, Joseph; and Olive, Joseph Philip, 4,022,974.

Oliver, Calvin W., to United States of America, Army. Pulse comparison system. 4,023,110, Cl. 328-109.000.

Olliges, William E.; and Polanek, Edward L., to Universal Research Laboratories, Inc. Printed circuit board for a solid-state sound effect generating system. 4,023,078, Cl. 361-399.000.

Olsbo, Ake Gunnar; Windt, Dag Anders; and Lundberg, Lars-Erik, to AB Volvo Penta. Device for indicating the oil level in a combustion engine crankcase. 4,023,137, Cl. 340-59.000.

Olson, Gary Lee; and Saucy, Gabriel, to Hoffmann-La Roche Inc. Vitamin A esters. 4,022,807, Cl. 260-410.000.

Oman, William S. Irrigation purge valve. 4,022,244, Cl. 137-517.000.

Omron Tateisi Electronics Co.: *See—*
Ano, Shizuya; and Uchida, Yasuo, 4,023,012.

Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Process for preparing diarylketones. 4,022,838, Cl. 260-591.000.

Orazio, Svelto; Rinaldo, Cubeddu; Federico, Zagara; Quirino, Mengarelli; and Clemente, Riccardi, to U.S. Philips Corporation. Monochromator. 4,022,531, Cl. 356-100.000.

Orlowski, David C. Sealing rings. 4,022,479, Cl. 277-53.000.

Oroshnik, William: *See—*
Soldati, Gianluigi; Finkelstein, Paul; Schlichting, David A.; and Oroshnik, William, 4,022,787.

Orscheln Brake Lever Mfg. Company: *See—*
Bopp, Robert D.; and Klosterman, David P., 4,022,509.

Ortho Pharmaceutical Corporation: *See—*
Kanojia, Ramesh Maganlal, 4,022,892.

Oscarson, John R.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,022,885.

Otani, Kiyoshi: *See—*
Sawa, Shigeki; Anbo, Takeshi; Otani, Kiyoshi; and Kutsuwa, Yoshikazu, 4,022,701.

Otsuka Pharmaceutical Company Limited: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, 4,022,776.
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamara, Shigeharu, 4,022,784.

Oude Alink, Bernardus A.; and Thompson, Neil E. S., to Petrolite Corporation. Substituted pyridines and dihydropyridines. 4,022,785, Cl. 260-290.00P.

Oura, Toshio, to Nippon Electric Company, Ltd. Signal generating circuit. 4,023,122, Cl. 331-111.000.

Outboard Marine Corporation: *See—*
Artff, Uwe F., 4,021,913.
Stephenson, Donald K., 4,022,291.

Owa, Kaoru, to Toyoda Koki Kabushiki Kaisha. Control apparatus for a machine tool. 4,023,084, Cl. 318-603.000.

Owens-Corning Fiberglas Corporation: *See—*
Hepner, Jack J.; and Hite, Richard S., 4,022,248.

Owens-Illinois, Inc.: *See—*
Dawson, Roy E., 4,022,604.
Tashiro, Megumi; Wada, Masamichi; Yamanaka, Toshio; and Tani, Kenichi, 4,022,627.

Oxlade, Roy R.: *See—*
Gibson, Keith C.; Hookins, John M.; and Oxlade, Roy R., 4,021,900.

P. R. Mallory & Co., Inc.: *See—*
Schuder, Maurice E.; Underwood, David W.; and Weber, Richard H., 4,022,075.
Weber, Richard H., 4,022,376.
Woodberry, Paul T.; and Wilson, Donald G., 4,022,648.

Paakkinen, Ilmari: *See—*
Kostiainen, Aatos; Paakkinen, Ilmari; and Rantasuo, Paavo, 4,022,231.

Pace, Anacleto. Formwork and connecting means apparatus for casting reinforced concrete. 4,022,420, Cl. 249-194.000.

Pacific Textile & Chemical Corporation: *See—*
Meckling, John H., 4,023,057.

Pagdin, Brian Colin; Webb, Oswald; Rolt, Anthony Peter Roylance; and Walker, Frederick James, to GKN Transmissions Limited; and Harry Ferguson Limited. Control couplings. 4,022,084, Cl. 74-711.000.

Pagliaro, Vincent A.; and Walters, Richard G., to Printing Developments, Inc. Composite developer-etch composition for chromium-plated lithographic printing plates. 4,022,619, Cl. 96-33.000.

Palachek, Charles V.: *See—*
Drees, Jan M.; Gravley, Arthur D.; Palachek, Charles V.; and Spencer, James L., 4,022,546.
Palilla, Frank C.; Gaudet, Gary G.; and Lingertat, Helmut, to GTE Laboratories Incorporated. Catalytic process for removing sulfur dioxide from gas streams. 4,022,870, Cl. 423-244.000.
Palmer, Brian Michael: *See—*
Allen, John Kenneth; Palmer, Brian Michael; and McGrath, Brian Patrick, 4,022,846.
Palmer, Thomas W., III: *See—*
Campagna, Edward R.; Hardy, Donald F.; Palmer, Thomas W., III; Daugherty, Barney R.; and Letawa, John R., 4,022,155.
Palumbo, Luigi; and Colletta, Angelo, to Centro Sperimentale Metallurgico S.p.A. Process for the production of formed coke. 4,022,668, Cl. 201-5.000.
Panetta, Patrick F.: *See—*
Glasser, Herman; and Panetta, Patrick F., 4,021,862.
Pankov, Gennady Ivanovich: *See—*
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.
Pankuch, Peter Jerome, to Envirotech Corporation. Sealed sedimentation device. 4,022,697, Cl. 210-530.000.
Parenti, Francesco; Coronelli, Carolina; Tamoni, Giorgio; and Lancini, Giancarlo, to Gruppo Lepetit S.p.A. Gardimycin and process for producing same. 4,022,884, Cl. 424-117.000.
Parke, Davis & Company: *See—*
Tinney, Francis John; and Campbell, Alfred, 4,022,759.
Tinney, Francis John, 4,022,760.
Tinney, Francis John; Nicolaides, Ernest D.; Hutt, Marland Paul; and Mich, Thomas Frederick, 4,022,761.
Parker, David William; Penna, David Edward; Smith, Frederick Warren; and Stevens, Richard, to U.S. Philips Corporation. Acoustic surface wave devices. 4,023,124, Cl. 333-72.000.
Parker-Hannifin Corporation: *See—*
Marietta, Walter Edwin, 4,022,022.
Parker, James E., to I. C. L. Scientific. Method and apparatus for preparation of liquids containing suspended material for examination. 4,022,576, Cl. 23-230.00R.
Parker, Keith, to Dart Industries Inc. Dispensing container and closure. 4,022,464, Cl. 222-485.000.
Patella, Ralph F.; and Vona, Joseph A., to Celanese Corporation. Aqueous dispersions of vinyl acetate/polyacrylate ester of pentaerythritol/hydroxymethyl diacetone acrylamide copolymers having improved adhesion properties. 4,022,743, Cl. 260-29.60T.
Patentex S.A.: *See—*
Lacoste, Francois Rene; and Warnery, Jean Marc, 4,022,469.
Patrick, Oliver B.: *See—*
McBee, William C.; Sullivan, Thomas A.; and Patrick, Oliver B., 4,022,626.
Pavlopoulos, Theodore G., to United States of America, Navy. Method of fabricating low-loss channel optical waveguides. 4,022,602, Cl. 65-102.000.
Pawl, George J.: *See—*
Badalich, Frank C.; and Pawl, George J., 4,022,526.
Pedersen, George C. Porous packing and separator medium. 4,022,596, Cl. 55-528.000.
Peer, John Charles, to RCA Corporation. Vertical deflection circuit. 4,023,069, Cl. 315-397.000.
Pegels, Abraham A.; and Scheffer, Hendrik J., to Shell Oil Company. Method for filling a reactor with solid particles. 4,022,255, Cl. 141-1.000.
Pehr, Harold T. Container cover and safety closure. 4,022,352, Cl. 222-153.000.
Peillex, Paul, to Arisara Investment Corporation. Protecting glasses. 4,021,878, Cl. 15-250.280.
Pelletier, Henri. Apparatus for conveying bulk material. 4,022,336, Cl. 214-44.00R.
Pelosi, Stanford S., Jr., to Morton-Norwich Products, Inc. 2-(5-Phenyl-2-furyl)imidazolines. 4,022,798, Cl. 260-309.600.
Peltzer, Bernd: *See—*
Kreuder, Hans Joachim; Peltzer, Bernd; Beckers, Johannes; Kremer, Wolfgang; and Kempermann, Theo, 4,022,724.
Pena-Kipper, Enrique A. Apparatus for performing physical exercises. 4,022,462, Cl. 272-74.000.
Peng, Fred M.; and Dalton, William O., to Monsanto Company. Graft polymerization process. 4,022,733, Cl. 260-29.7UP.
Penna, David Edward: *See—*
Parker, David William; Penna, David Edward; Smith, Frederick Warren; and Stevens, Richard, 4,023,124.
Pennock, Michael Derek, to British Petroleum Company Limited, The. Method and apparatus for orienting equipment in a well. 4,022,281, Cl. 166-315.000.
Perez, Porfirio F.: *See—*
Fainberg, Samuel M.; and Perez, Porfirio F., 4,022,894.
Perfiliev, Evgeny Alexeevich: *See—*
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Perkin-Elmer Corporation, The: *See—*
Marshall, Hamilton W., Jr.; Ducret, Lucian C.; and Atwood, John G., 4,022,240.
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Permalock Company, Inc.: *See—*
Abel, Martin L., 4,022,642.
Perren, Benno. Method for the non-mechanical conveying of a collected quantity of liquid and apparatus for the performance of the method. 4,022,687, Cl. 210-65.000.
Perrigo, Wallace; and Spears, Esten W., Jr., to General Motors Corporation. Assembled diffuser. 4,022,541, Cl. 415-207.000.
Personal Communications, Inc.: *See—*
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Peterson, John M., to United States of America, Navy. Fan lift-cruise v/stol aircraft. 4,022,405, Cl. 244-123.000.
Petke, Frederick D.: *See—*
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Petrolite Corporation: *See—*
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Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich, 4,022,048.
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Peuterbaugh, Bruce G., to J. P. Tool, Inc. Boring bar structure. 4,022,539, Cl. 408-188.000.
Pfeiffer, Aloysius T.; and Romankiw, Lubomyr T., to International Business Machines Corporation. Methods for forming thick self-supporting masks. 4,022,927, Cl. 427-43.000.
Pfeil, Wolfgang: *See—*
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van Kessel, Theodorus Jozef; Stulemeijer, Eric Henricus Jozef Maria; Pieper, Johannes Maria; and Bloemen, Hendrikus Fransiscus Bonifatius, 4,023,099.
Piepho, Donald A.; and Knop, Frederick L., Jr., to Caterpillar Tractor Co. Hinge pin construction. 4,022,536, Cl. 403-16.000.
Pietryka, Joseph, to Fives-Cail Babcock. Continuous casting installation. 4,022,267, Cl. 164-260.000.
Pike, Bernard; Brewin, Thomas A.; and Kokinos, Charles, Jr., to GTE Sylvania Incorporated. Ruggedized, high power tungsten-halogen lamp. 4,023,060, Cl. 313-273.000.
Pike, Charles T.: *See—*
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Pimiskern, Klaus; and Herbert, Werner, to Dornier System GmbH. Centrifugal spinning unit and bearing arrangement for the same. 4,022,008, Cl. 57-100.000.
Piper, Alfred E. C., to ITW Limited. Adjustable security straps. 4,021,892, Cl. 24-274.00R.
Pires, H. George, to Teleglobe Pay TV System Inc. Transient suppression and grey level coincidence in a subscription television system. 4,022,972, Cl. 358-124.000.
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Piwcyzk, Bernhard P. Vacuum deposition methods and masking structure. 4,022,928, Cl. 427-43.000.
Pizzocri, Guido, to Industria Napoletana Costruzione Autoveicoli Alfa

Romeo ALFASUD S.p.A. Safety device for a motor vehicle steering system. 4,022,495, Cl. 280-750.000.
Plaiss, Charles E. Lock. 4,022,486, Cl. 280-289.00L.
Plasko, Emil Robert, to Emerson Electric Co. Electrical protection means and method. 4,023,072, Cl. 361-50.000.
Plasmine Corporation, The: *See*—
Emerson, Ralph Waldo; and Shattuck, John R., 4,022,634.
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Fitzgerald, Maurice J.; Kolesinski, Henry S.; and Taylor, Lloyd D., 4,022,623.
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Politzer, Anton; and Machmer, Wilhelm, to DIEHL. Breechblock sealing for large-caliber barreled weapons. 4,022,104, Cl. 89-26.000.
Pollak-Banda, Erich; and John, Erich, to Fa. Zahnraederfabrik Renk AG. Drive system for connecting two drive shafts to a single output shaft, as in a propeller drive for a watercraft. 4,022,083, Cl. 74-665.00B.
Polson, Charles L.: *See*—
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Pool, Robert B. Method for making preformed lacrosse netting. 4,022,477, Cl. 273-96.00D.
Poole, Eric John; and Morris, Sidney John, to Compair Industrial Limited. Rotary piston compressor with inlet and discharge through the pistons which rotate in the same direction. 4,022,553, Cl. 418-183.000.
Popescu, Francine. Alkaline bright zinc electroplating bath. 4,022,676, Cl. 204-55.00R.
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Etingov, Evgeny Davidovich; Bashkovich, Alexandr Pavlovich; Kulbakh, Valter Osvaldovich; Raigorodskaya, Valentina Yakovlevna; Popova, Inessa Vladimirovna; Alexeeva, Ljudmila Evgenievna; Nyn, Vladimir Semenovich; and Lokhina, Nadezhda Dmitrievna, 4,022,886.
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Poterala, Robert J.; and Richards, Marshall C., to Crompton & Knowles Corporation. Textile spreader roller. 4,021,894, Cl. 26-105.000.
Potter, Arthur Robin: *See*—
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Powell, James E.: *See*—
Roman, Steven A.; and Powell, James E., 4,022,775.
Powell, Lee V. Maternity mattress. 4,021,872, Cl. 5-338.000.
Powell, William. Ski device. 4,022,482, Cl. 280-11.37E.
Powell, William. Ski apparatus. 4,022,491, Cl. 280-618.000.
PPG Industries, Inc.: *See*—
Carson, Donald R.; and Holden, Calvin B., 4,022,872.
Hardies, Donald E.; and Rinehart, Jay K., 4,022,609.
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Prammer, Franz: *See*—
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Prestele, Karl: *See*—
Franetzki, Manfred; Korn, Volker; and Prestele, Karl, 4,022,193.
Preston, James N. Gravity and velocity-change differentiator. 4,022,064, Cl. 73-382.00R.
Price, Michael G.: *See*—
Brooker, Gary; Terasaki, Wesley L.; and Price, Michael G., 4,022,577.
Price, William Edward. Resuscitator inhalator oxygen ventilator. 4,022,202, Cl. 128-145.800.
Prickril, William A., to Cities Service Company. Hot melt protective wax coating. 4,022,729, Cl. 260-28.50B.
Printing Developments, Inc.: *See*—
Pagliaro, Vincent A.; and Walters, Richard G., 4,022,619.
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Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Process for preparing shaped, foamed polyurethane articles. 4,022,722, Cl. 260-2.5AH.
Prokai, Bela; and Kanner, Bernard, to Union Carbide Corporation. Organosilicone polymers in polyurethane foams for carpet backing. 4,022,941, Cl. 427-358.000.
Przygocki, Witold C., to Acme Mfg. Company. Wide abrasive belt tension and oscillation assembly. 4,021,970, Cl. 51-148.000.
Pugin, Andre: *See*—
L'Eplattenier, Francois; Pugin, Andre; and von der Crone, Jost, 4,022,770.
Purdue Research Foundation: *See*—
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Nelson, Philip E., 4,022,922.
Purdy, Floyd E. Snow handling and conditioning apparatus. 4,021,942, Cl. 37-10.000.
Putt, James B.; and Welsh, Harold H., Jr., to Bendix Corporation, The. Flow through cap for attenuating any noise caused by air flow in a pneumatic servomotor. 4,022,112, Cl. 91-376.00R.
Putt, James B.: *See*—
Dodd, Thomas E.; and Putt, James B., 4,022,081.
Puttbach, Richard Charles: *See*—
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Cummings, Lowell O., 4,022,946.
Quan, Peter Michael: *See*—
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Queen, David S.; and Mitchell, John, to Sidlaw Industries Limited. Method of and apparatus for cutting sheet material. 4,022,087, Cl. 83-27.000.
Quirino, Mengarelli: *See*—
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Weller, Ronald G., 4,022,365.
R. C. Metals, Inc.: *See*—
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Raab, Andrew F.; and Halstead, Raymond T., to Indak Manufacturing Corporation. Slide action electrical switches having contact detenting structure. 4,022,994, Cl. 200-16.00C.
Raabo, Ulf: *See*—
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Rain, Lloyd Howard, to Irvin Industries, Inc. Projection screen. 4,022,522, Cl. 350-117.000.
Rainer, Norman B.; and Hoelzel, Charles B., to Philip Morris Incorporated. Smoking article. 4,022,223, Cl. 131-10.900.
Rake, Robert Wayne; Tingley, Albert Sanford; and Walter, Thomas Arthur, to Western Electric Company, Inc. Apparatus for sealing a cable core with waterproofing compound. 4,022,153, Cl. 118-68.000.
Ramin, James A.; and Stearns, Stanley D. Calibrated sample delivery apparatus accommodating offset error. 4,022,065, Cl. 73-422.0GC.
Ramirez, Fausto: *See*—
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Ramsey, Merlin G. Adjustable socket wrench. 4,022,086, Cl. 81-116.000.
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Rasekhi, Houshang; and Shemkunas, Philip Owen, to Addressograph

Multigraph Corporation. Magnetic brush developer equipped with self-metering controls. 4,022,157, Cl. 118-658.000.
Rasicci, Vincent Martion; Swanson, Raymond Nicholas; and Clotz, Paul Arthur, to B. F. Goodrich Company, The. Polymer latices containing a water soluble salt of polybasic fatty acid and 2-alkyl imidazoline derivative for use in fiber dispersions. 4,022,734, Cl. 260-29.6MN.
Ray, Eric Thomas, to AMF Incorporated. Drum opening and closing mechanism. 4,022,093, Cl. 83-355.000.
Raychem Limited: *See—*
Hill, Frederick William Leslie, 4,022,519.
Raymond Lee Organization, Inc., The: *See—*
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RCA Corporation: *See—*
Bartolini, Robert Alfred; Burke, William Joseph; and Bloom, Allen, 4,022,618.
Bloom, Allen; Bartolini, Robert Alfred; and Bell, Alan Edward, 4,023,185.
Brooks, Ronald Robert, 4,023,049.
Firester, Arthur Herbert, 4,022,533.
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Keizer, Eugene Orville, 4,022,968.
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Read, Frank E. Cross-flow vaporizer. 4,022,173, Cl. 123-122.00E.
Read, Norman Weldon, to Dresser Industries, Inc. Indexing valve mechanism. 4,022,426, Cl. 251-340.000.
Read, Norman Weldon, to Dresser Industries, Inc. Sleeve valve mandrel and seal means for indexing valve assembly. 4,022,427, Cl. 251-343.000.
Ream, Winston Dale: *See—*
West, Roger A.; and Ream, Winston Dale, 4,022,063.
Rebhan, Horst. Infants' feeding bottle. 4,022,060, Cl. 73-343.00B.
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Lau, Edward H.; and Chu, Mosi, 4,022,313.
Redding, Robert J. Electrically-operated release apparatus. 4,022,131, Cl. 102-70.20R.
Redicon Corporation: *See—*
Bulso, Joseph D., Jr.; and Lewers, William R., 4,022,089.
Reeder, Lehan James. Vehicle suspension unit and method of assembly thereof. 4,022,448, Cl. 267-8.00R.
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Hansen, Charles C., III; Nilles, John D.; and Kivioja, Olaf E., 4,022,114.
Regeaud, Jean-Pierre; Trebillon, Emile; and Wetroff, Georges, to Rhone-Progil. Fire resistive plasticizer and method. 4,022,812, Cl. 260-456.00P.
Regie Nationale des Usines Renault: *See—*
Berrie, Yves; Sebire, Claude; and Dolle, Francois, 4,022,307.
Reid, Joyce: *See—*
Hauck, Frederic Peter; Reid, Joyce; and Kane, Vinayak V., 4,022,788.
Reindel, John, to United States of America, Navy. Microstrip reverse-phased hybrid ring coupler. 4,023,123, Cl. 333-11.000.
Reinhard, Kenneth E.: *See—*
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Remington Arms Company, Inc.: *See—*
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Remner, Robert A.; and Ries, Donald G., to Aetna-Standard Engineering Company. Hose reel for piercer and reeler outlet tables. 4,022,047, Cl. 72-201.000.
Remy, David C., to Merck & Co., Inc. 10,11-Dihydro-3-carboxycyproheptadien-N-oxide. 4,022,902, Cl. 424-267.000.
Renirie, Alexis C. M., to Vitatron Medical B.V. Low current drain amplifier incorporating means for minimizing sensitivity drift. 4,023,046, Cl. 307-360.000.
Renis, Harold E.: *See—*
Bannister, Brian; DeBoer, Clarence; and Renis, Harold E., 4,022,889.
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Retla Steamship Company: *See—*
Ross, David G.; and Wybenga, Jack, 4,022,232.
Reuter, Franz Gottfried; and Holl, Peter, to Polymer-Physik GmbH & Co. KG. Process for coating metal surfaces with synthetic resins. 4,022,925, Cl. 427-35.000.
Reuter, William L., to Dunham Associates, Inc. Inductorless symmetrical component sequence analyzer. 4,023,075, Cl. 361-76.000.
Revercomb, Jess G. Bicycle carrier. 4,022,362, Cl. 224-42.10F.
Revillet, Georges; Sanz, Manuel C.; and Nicole, Andre, to Micromedic Systems, Inc. Transport system for analytical equipment. 4,022,579, Cl. 23-259.000.
Rez, Donald H., to Associated Concrete Products, Inc. Aligning bracket for underground sectional precast concrete structures and method of assembly. 4,021,979, Cl. 52-127.000.
Rheinfelder, William A., to Alpha Engineering Corporation. System for establishing signal level for transmission of a CATV cable. 4,023,104, Cl. 325-308.000.
Rhone-Progil: *See—*
Regeaud, Jean-Pierre; Trebillon, Emile; and Wetroff, Georges, 4,022,812.
Richards, Marshall C.: *See—*
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Richardson, John Eric. Protective device for compressed gas cylinders. 4,022,343, Cl. 220-3.000.
Richardson-Merrell Inc.: *See—*
Grunwell, Joyce F.; and Petrow, Vladimir, 4,022,769.
Suh, John T.; and Schnettler, Richard A., 4,022,910.
Richman, Paul, to SMC Microsystems Corporation. MOS field-effect transistor structure with mesa-like contact and gate areas and selectively deeper junctions. 4,023,195, Cl. 357-23.000.
Richter, Sidney B.; and Krenzer, John, to Velsicol Chemical Corporation. N-α-chloroacetyl-N-(1,3-dioxolan-2-ylmethyl)-2-ethyl-6-methylaniline as a herbicide. 4,022,608, Cl. 71-88.000.
Ricoh Co., Ltd.: *See—*
Shimada, Masato; and Kobayashi, Katsuomi, 4,022,738.
Riddick, Max F. Surgical suction tube. 4,022,218, Cl. 128-350.00R.
Ridler, Keith Douglas; Edge, Gordon Malcolm; and Whelan, Robert Charles, to Strathearn Audio Limited. Pivoted arm control arrangements. 4,023,130, Cl. 335-219.000.
Riedel-de Haen Aktiengesellschaft: *See—*
Lieser, Karl Heinrich; and Burba, Peter, 4,022,964.
Ries, Donald G.: *See—*
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Rikagaku Kenkyusho: *See—*
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Riker Laboratories, Inc.: *See—*
Scherrer, Robert A., 4,022,908.
Rimpinen, Heikki; and Kohonen, Martti, to G.A. Serlachius Oy. Plant-cup element. 4,021,966, Cl. 47-86.000.
Rinaldo, Cubeddu: *See—*
Orazio, Svelto; Rinaldo, Cubeddu; Federico, Zagara; Quirino, Mengarelli; and Clemente, Riccardi, 4,022,531.
Rinehart, Jay K.: *See—*
Hardies, Donald E.; and Rinehart, Jay K., 4,022,609.
Rinse, Jacobus, to MOACO Metal Oxide Acylates Company. Condensed oligomeric organo metallic resinous acylates containing ligands of monobasic carboxylic acid of at least 7 carbon atoms and bridging radicals of divalent carboxylic acids of at least 6 carbon atoms and processes for producing such resins. 4,022,725, Cl. 260-18.00R.
Risdon Manufacturing Company, The: *See—*
Kotuby, Paul M., 4,022,354.
Ritter, Helmut: *See—*
Slavik, Valter; Ghirlanda, Hieronimus; Ritter, Helmut; and Durr, Arthur, 4,022,389.
Ritter, Wilhelm. Actuator structure for ball-point pens and other writing instruments. 4,022,535, Cl. 401-32.000.
Roach, Michael D.: *See—*
Bartlett, Gordon E.; and Roach, Michael D., 4,021,996.
Roamer, Louis S. Attachment for a liquid container. 4,022,344, Cl. 220-4.00A.
Robert Bosch G.m.b.H.: *See—*
Eckert, Konrad; Steiner, Josef; Zeilinger, Klaus; and Eidtmann, Helmut, 4,022,165.
Hess, Heinz, 4,023,200.
Robert Parker Research, Inc.: *See—*
Davis, Frederick, 4,022,706.
Roberts, Marvin A. Floating solar heater for swimming pools. 4,022,187, Cl. 126-271.000.
Robertshaw Controls Company: *See—*
Wagner, Joseph P.; and Sliger, Boyd P., 4,022,377.
Roche, Michel: *See—*
Bakes, Michel; and Roche, Michel, 4,022,703.
Rocksvold, Alvin N., to Landplane, Marvin. Turret-type hitch unit for pickup trucks. 4,022,490, Cl. 280-500.000.
Rockwell, Harvey W., to Fiat-Allis Construction Machinery, Inc. Method for reclaiming strip-mined land. 4,022,282, Cl. 172-1.000.
Rockwell International Corporation: *See—*
Schweitzer, Raymond Louis; Then, Eugene Robert; and Pool, Eldert Bergen, 4,022,247.
Staley, Lewis E., 4,023,016.
Strathman, Lyle R.; Bolin, Robert A.; Collins, Vincent B.; and Swanson, Ronald L., 4,023,027.
Volpe, Richard L.; and Wheeler, Claude, 4,022,254.
Roderick, Zackary A.; and Ross, Robert G., to Galgon Industries, Inc. Support for tie back and return of drapery. 4,022,415, Cl. 248-298.000.
Rodgers, James L., to Talos Systems, Inc. Method and apparatus for

converting the location and movement of a manually controlled instrument into corresponding electrical signals. 4,022,971, Cl. 178-19.000.

Rodriguez, Edward T., to Creative Technology Corporation. Light sensitive lamp adapter. 4,023,035, Cl. 250-239.000.

Roeder, Erwin; and Steinbeck, Edmund, to U.S. Philips Corporation. Device for manufacturing hollow profiled bodies by extrusion. 4,022,603, Cl. 65-145.000.

Rogers, Austin S., to W. R. Grace & Co. Apparatus for sensing metal in wells. 4,023,092, Cl. 324-34.00R.

Rohm and Haas Company: *See—*
Aller, Harold Ernest, 4,022,890.
Lewis, Sheldon N.; Gehman, David R.; and Haggard, Richard A., 4,022,730.

Roland, Max G. Coiled vibratory feeder. 4,021,902, Cl. 29-786.000.

Rollcast S.A.: *See—*
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Rolls-Royce (1971) Limited: *See—*
West, Richard; and Weston, Donald Leslie Amos, 4,023,006.

Rolt, Anthony Peter Roylance: *See—*
Pagdin, Brian Colin; Webb, Oswald; Rolt, Anthony Peter Roylance; and Walker, Frederick James, 4,022,084.

Roman, Steven A.; and Powell, James E., to Shell Oil Company. 3-Oxomethyl-2-(1-nitro-2-oxoethylidene)-tetrahydro-2H-1,3-thiazines. 4,022,775, Cl. 260-243.00R.

Romankiw, Lubomyr T.: *See—*
Pfeiffer, Aloysius T.; and Romankiw, Lubomyr T., 4,022,927.

Rooney, Sidney C., to Durad Machine Company Ltd. Sheet handling apparatus. 4,022,366, Cl. 226-91.000.

Root, William Edwin. Fitted top sheet and blanket. 4,021,869, Cl. 5-334.00C.

Ropp, John G.; and Mann, Steven A. Nail polish remover device. 4,022,228, Cl. 132-75.000.

Rosen, George, to Sun Chemical Corporation. Photopolymerizable compounds and compositions comprising the product of the reaction of a monomeric ester and a polycarboxy-substituted benzophenone. 4,022,674, Cl. 204-159.220.

Ross, David G.; and Wybenga, Jack, to Retla Steamship Company. Inverted cargo hatch tent. 4,022,232, Cl. 135-6.000.

Ross, James W., Jr.; and Bricmont, Francis H., to Caterpillar Tractor Co. Warm form cooling and heat recovery tunnel. 4,022,570, Cl. 432-82.000.

Ross, Robert G.: *See—*
Roderick, Zackary A.; and Ross, Robert G., 4,022,415.

Roth, Marvin E.; and Vallere, Donald J., to Western Electric Company, Inc. Synchronous shielding in vacuum deposition system. 4,022,939, Cl. 427-251.000.

Roth, Peter R., to Hewlett-Packard Company. Noise burst source for transfer function testing. 4,023,098, Cl. 324-77.00R.

Rothenberg, Sidney: *See—*
MacKenzie, Burton Thornley, Jr.; and Rothenberg, Sidney, 4,022,945.

Roto-Finish Company: *See—*
Balz, Gunther W., 4,022,012.

Rototron Corporation: *See—*
Dawson, John, 4,022,564.

Rotter, Gerhard; Burdorf, Donald L.; and Arns, Harold E., to BASF Aktiengesellschaft. Tape threading apparatus. 4,022,400, Cl. 242-192.000.

Routien, John B.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Oscarson, John R.; and Routien, John B., 4,022,885.

Routson, Willis G., to Dow Chemical Company, The. In situ solvent fractionation of bitumens contained in tar sands. 4,022,277, Cl. 166-267.000.

Rowe, Barry; and Rymer, Harold Frank, to Ferranti, Limited. Apparatus for processing data relating to information represented by lines on a chart. 4,023,025, Cl. 235-152.000.

Rowean, Donald R., to Dupaco Incorporated. Cuff configuration for cuff tracheal tubes. 4,022,217, Cl. 128-349.00B.

Roy, Waldemar: *See—*
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Royal Industries, Inc.: *See—*
Rumsey, Thomas R., 4,022,411.

Rozenberg, Jury Borisovich: *See—*
Bukhman, Aron Borukhovich; Yanushkevich, Igor Lvovich; Kalashnikov, Vadim Dmitrievich; Levitina, Marina Isaakovna; Rozenberg, Jury Borisovich; Elkin, Vladimir Valentinovich; and Ponomareva, Elena Mikhailovna, 4,023,177.

Rubens, Harry Ernest. Permanent coloring coat for natural teeth. 4,021,915, Cl. 32-15.000.

Rubinstein, Charles Benjamin: *See—*
Netravali, Arun Narayan; and Rubinstein, Charles Benjamin, 4,023,199.

Rudorfer, Hermann; Wagner, Anton; Prammer, Franz; and Klausner, Friedrich, to Chemie Linz Aktiengesellschaft. Device for the recovery of noble metals. 4,022,581, Cl. 23-288.00R.

Rudy, Erwin. Sintered cermets for tool and wear applications. 4,022,584, Cl. 228-122.000.

Ruess, Alfred P. Tennis practice device. 4,022,467, Cl. 273-29.00A.

Rumsey, Thomas R., to Royal Industries, Inc. Self-levelling seat suspension system for vehicles. 4,022,411, Cl. 248-400.000.

Rush, Elton E., to Phillips Petroleum Company. Catalyst activation. 4,022,580, Cl. 23-288.00B.

Russ, Stephen J.; and Beke, Zoltan, to Midland-Ross Corporation. Air circulating apparatus for floating material in web form. 4,021,931, Cl. 34-156.000.

Russell, Dorothy Burnham. Handbag with display pockets. 4,022,261, Cl. 150-28.00A.

Russell, Wayne B., Jr. Constant speed hydraulic motor. 4,022,021, Cl. 60-420.000.

Russo, Robert Victor, to GAF Corporation. High resilience fire retardant urethane foam. 4,022,718, Cl. 260-2.5AM.

Ruzicka, Jaromir: *See—*
Hansen, Elo Harald; and Ruzicka, Jaromir, 4,022,575.

RWB Labs: *See—*
West, Roger A.; and Ream, Winston Dale, 4,022,063.

Ryan, Patrick Walter: *See—*
Sheng, Ming Nan; Mameniskis, Walter Anthony; and Ryan, Patrick Walter, 4,022,681.

Rymer, Harold Frank: *See—*
Rowe, Barry; and Rymer, Harold Frank, 4,023,025.

Saaski, Elric W., to McDonnell Douglas Corporation. Liquid degassing device. 4,022,592, Cl. 55-189.000.

Sabaka, George. Cartridge for containing and dispensing viscous material. 4,022,355, Cl. 222-327.000.

Saczawa, John S., Jr., to General Motors Corporation. Energy absorbing cellular media for vehicles. 4,022,505, Cl. 293-71.00R.

Sadler, Clinton P. Fluid pressure controlled circuit breaker as boat safety apparatus. 4,022,146, Cl. 115-76.000.

Safe Flight Instrument Corporation: *See—*
Greene, Leonard M., 4,022,150.

Sagnard, Jean: *See—*
Galves, Jean Pierre; and Sagnard, Jean, 4,023,039.

Saifer, Mark G.; Williams, Lewis D.; and Huber, Wolfgang, to Diagnostic Data, Inc. Reduction of superoxide accumulation caused by smoke inhalation. 4,022,224, Cl. 131-262.00R.

Saifer, Mark G.: *See—*
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,022,877.
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,022,888.

Saint, David. Educational device. 4,021,940, Cl. 35-74.000.

Saint, David, to Graco Metal Products, Inc. Seat for baby swing. 4,022,510, Cl. 297-153.000.

Saint-Gobain Industries: *See—*
Durussel, Philippe, 4,023,008.

St. Jean, Gerard: *See—*
Ewart, James M.; Anderson, Clay H.; and St. Jean, Gerard, 4,022,410.

Saitoh, Shigeru; Watanabe, Tetsuya; and Komahashi, Katsutoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for removing hydrogen chloride from exhaust gas containing same. 4,022,869, Cl. 423-240.000.

Sakakibara, Sakuichi; Sugisawa, Ko; Yamamoto, Masanori; Kimura, Takashi; and Sekiguchi, Kazuya, to House Food Industrial Company Limited. Method of retarding oxidation of edible fat or oil in stored food. 4,022,921, Cl. 426-542.000.

Salter, Lowell S., Jr., to Morgan Construction Company. Neck seal. 4,022,480, Cl. 277-95.000.

Saltykov, Alexandr Nikolaevich; Gorbatov, Vasily Matveevich; Saltykov, Jury Alexandrovich; and Saltykov, Oleg Alexandrovich. Apparatus for stripping hide from animal carcasses. 4,021,884, Cl. 17-21.000.

Saltykov, Jury Alexandrovich: *See—*
Saltykov, Alexandr Nikolaevich; Gorbatov, Vasily Matveevich; Saltykov, Jury Alexandrovich; and Saltykov, Oleg Alexandrovich, 4,021,884.

Saltykov, Oleg Alexandrovich: *See—*
Saltykov, Alexandr Nikolaevich; Gorbatov, Vasily Matveevich; Saltykov, Jury Alexandrovich; and Saltykov, Oleg Alexandrovich, 4,021,884.

Salvia, Matthew. Shipping cage for feeding animals water from disposable bags. 4,022,159, Cl. 119-19.000.

Sam, Donnie Joe; and Wuonola, Mark A., to Du Pont de Nemours, E. I., and Company. Imidazoquinoxaline fungicides. 4,022,777, Cl. 260-250.00Q.

Samburg, Gene. Security control and alarm system. 4,023,139, Cl. 340-147.00R.

Sandoz, Inc.: *See—*
Jackson, Thomas E., 4,022,607.

Sandvik Aktiebolag: *See—*
Lundstrom, Hans Per Olof; and Wiredal, Harry Arthur, 4,022,287.

Sankyo Company Limited: *See—*
Tachikawa, Ryuji; Miyadera, Tetsuo; Terada, Atsusuke; Kamioka, Toshiharu; and Naruto, Syunji, 4,022,832.

Sanyo Electric Co., Ltd.: *See—*
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Sanz, Manuel C.: *See—*
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Sasahira, Seiichi: *See—*
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Schacht, Ezra L. Light admitting means for photocell-controlled lighting fixture. 4,023,034, Cl. 250-227.000.
Schade, William J., to United States of America, Navy. Stimulated raman scattering resonator. 4,023,117, Cl. 331-94.50N.
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Scheib, William R.; and Shaffer, Ralph M., Jr., to Aetna-Standard Engineering Company. Multiple blade scrap saw for pipe mill. 4,022,092, Cl. 83-306.000.
Schendel, Robert E. Centroid target flow meter. 4,022,061, Cl. 73-228.000.
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Schlafer, John, to GTE Laboratories Incorporated. Scanning photographic printer for integrated circuits. 4,023,126, Cl. 355-51.000.
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Schmidt, Charles J., to Numax Electronics Incorporated. Monopulse system for cancellation of side lobe effects. 4,023,172, Cl. 343-16.00M.
Schmidt, Edward M., to United States of America, Army. Gas dynamic sabot stripper. 4,022,103, Cl. 89-14.0SB.
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Schoen, Lowhardt A. A.; and Busschers, Franciscus A., to Stamicarbon B.V. Process for the preparation of a glue based on a thermoplastic elastomeric block-copolymer. 4,022,745, Cl. 260-30.200.
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Schott, James G. Desk for physically handicapped persons. 4,022,136, Cl. 108-108.000.
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Schwarcz, Andor, to Nashua Corporation. Poly(amide acids) release agents for pressure-sensitive adhesive tapes. 4,022,732, Cl. 260-29.6NR.
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Selover, Theodore B., Jr.; and Boos, Donald L., to Standard Oil Company. Graphite-elastomer sandwich as impervious connector for an electrical capacitor. 4,023,079, Cl. 361-433.000.
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Shroff, James R.; and Cervoni, Peter P., to USV Pharmaceutical Corporation. Piperazinyl-imidazolines. 4,022,783, Cl. 260-268.00H.
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Smith, Barry E., Jr. Line tensioning device. 4,022,450, Cl. 267-73.000.
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Smith, Charles W., Jr.; and Zimmerman, Franz X., to Autoclave Engineers, Inc. Quenching in hot gas isostatic pressure furnace. 4,022,446, Cl. 266-252.000.
Smith, Clarence G., to Muskin Corporation. Integral pump skimmer and filter unit for above-ground swimming pools. 4,022,690, Cl. 210-169.000.
Smith, David Lynn; and Lupton, Mary B., to Plurielle, Inc. Arm or cushion support for furniture. 4,022,502, Cl. 297-414.000.
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Smith, Nicholas Kimbrough, to Bell Telephone Laboratories, Incorporated. Automatic in-service digital trunk checking circuit and method. 4,022,979, Cl. 179-15.0BF.
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Societe des Anciens Ateliers H. Jambon: *See*—
Forichon, Gaston Sebastien, 4,022,096.
Societe d'Etudes de Machines Thermiques: *See*—
Coulin, Jean-Paul Rene, 4,022,294.
Societe Generale de Fonderie: *See*—
Escaro, Jacques; and Chevalier, Maurice, 4,022,162.
Societe Nationale des Petroles d'Aquitaine: *See*—
Laprade, Bernard; Laprade, Xavier; and Gele, Pierre, 4,022,175.
Societe Nationale des Poudres et Explosifs: *See*—
de Cazenove, Hubert E.; Doyen, Daniel; Dussidour, Jacques M.; and Gautier, Jean-Jacques, 4,022,844.
Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See*—
Nicolas, Michel Jacques Robert, 4,023,115.
Soder A.G. Maschinenfabrik: *See*—
Bachmann, Hans, 4,022,123.
Soldati, Gianluigi; Finkelstein, Paul; Schlichting, David A.; and Oroshnik, William, to Carter-Wallace, Inc. Anticholinergic ester and salts thereof. 4,022,787, Cl. 260-293.810.
Solomon, David E., to KMS Fusion, Inc. Storage and shipping container for gas filled pellets. 4,022,348, Cl. 222-3.000.
Solvay & Cie: *See*—
Demilie, Paul, 4,022,871.
Sommer, Neithart; and Nordsiek, Karl-Heinz, to Chemische Werke Huels Aktiengesellschaft. Organolithium-Lewis base polymerization of 1,3-butadiene and novel polybutadienes thus produced. 4,022,959, Cl. 526-180.000.
Sommer, Richard; Wolfrum, Gerhard; and Siegel, Edgar, to Bayer Aktiengesellschaft. Sulfaphenyl-azo-phenyl-azo-aminophenyl dyestuffs. 4,022,763, Cl. 260-186.000.
Sony Corporation: *See*—
Kishi, Yoshio, 4,022,395.
Kishi, Yoshio, 4,022,401.
Nishibe, Atsushi; and Kikuchi, Yoshitaka, 4,023,206.
Sood, Raman Radha: *See*—
Farago, Frank John; Retallack, Dale Gordon; and Sood, Raman Radha, 4,022,569.
Sopko, John F., to PPG Industries, Inc. Method and apparatus for coating a glass substrate. 4,022,601, Cl. 65-60.00D.
Southam, Terence George, to Girling Limited. Parking actuator for a duo-servo drum brake. 4,022,305, Cl. 188-332.000.
Southwestern Industries, Inc.: *See*—
Szymber, Oleg, 4,022,044.
Southwire Company: *See*—
Benton, Charles M.; Cox, Paul, Jr.; Sprinkle, Paul M.; and Nowak, Frank John, 4,021,905.
Sowinski, Francis Alexander; and Vogt, B. Richard, to E. R. Squibb & Sons, Inc. 1,2,4-Benzothiadiazines. 4,022,774, Cl. 260-243.00D.
Sowman, Harold G.: *See*—
Johnson, James R.; and Sowman, Harold G., 4,022,660.
Spalding, Willard P., to Westinghouse Air Brake Company. Tread brake assembly. 4,022,304, Cl. 188-203.000.
Spalten, Robert. Dental dowel pin positioner. 4,021,916, Cl. 32-11.000.
Sparton Corporation: *See*—
Ankeny, Claude C.; Gladow, Dean E.; and Wierzbicki, Charles E., 4,023,000.
Spaude, Walter Charles; Wichman, Thomas Duane; Corrigan, Michael Thomas; and Joannon, Jimmie Carl, to J. I. Case Company. In-line system of packaging, securing, and weighing. 4,021,992, Cl. 53-3.000.
Spears, Esten W., Jr.: *See*—
Perrigo, Wallace; and Spears, Esten W., Jr., 4,022,541.
Specified Ceiling Systems: *See*—
McCall, Francis L.; and Taylor, Joel E., III, 4,021,986.
Spencer, James L.: *See*—
Drees, Jan M.; Gravley, Arthur D.; Palachek, Charles V.; and Spencer, James L., 4,022,546.
Spencer, Robert, to Simon-Barron Limited. Press having torque responsive drive. 4,022,562, Cl. 425-331.000.
Spencer, Robert, to Simon-Barron Limited. Presses. 4,022,563, Cl. 425-331.000.
Spener, Gerhard: *See*—
Hackstein, Karl-Gerhard; and Spener, Gerhard, 4,022,865.
Sperry Rand Corporation: *See*—
Crawford, LeRoy A.; and McIlwain, Irwin D., 4,022,121.
Lamensdorf, David; and Nicolson, Alexander Murray, 4,023,136.
McAllister, Ronald L., 4,022,120.
Strausser, Wilson L.; and Mast, Aquila D., 4,022,003.
Speyer, Fred B., to TRW Inc. Thermoplastic resinoid hot melt compositions. 4,022,727, Cl. 260-21.000.
Spoerke, Roger W., to Goodyear Tire & Rubber Company, The. Preparation of methacrylamides. 4,022,831, Cl. 260-562.00R.
Sporenberg, Willi; and Klockenhoff, Herbert, to Sundwiger Eisenhutte Maschinenfabrik Grah & Co. Device for conveying metal sheets for affixation to a windup drum for winding thereon. 4,022,367, Cl. 226-91.000.
Sprague, John S. Two-cycle rotary-reciprocal-engine. 4,022,168, Cl. 123-43.00A.
Spratling, Rodney Edwin: *See*—
Ferro, Berkeley Michael; Spratling, Rodney Edwin; and Walker, Aubrey Douglas, 4,022,709.
Sprinkle, Paul M.: *See*—
Benton, Charles M.; Cox, Paul, Jr.; Sprinkle, Paul M.; and Nowak, Frank John, 4,021,905.
Staber, Johann: *See*—
Schnebel, Fritz, deceased; Schnebel, Elfriede Johanna, inheritor; and Staber, Johann, 4,021,987.
Stackhouse, Bill L.; and Taylor, Theodore E., to General Electric Company. Apparatus for indicating synchronization and out-of-synchronization conditions. 4,022,973, Cl. 178-69.100.
Stahlwerke Bruninghaus GmbH: *See*—
Estorff, Eckart v., 4,022,449.

Staley, Lewis E., to Rockwell International Corporation. Signal characterizing apparatus. 4,023,016, Cl. 235-150.200.
Staloff, Marcus: *See—*
Bruder, Joseph A.; and Staloff, Marcus, 4,023,168.
Stamicarbon B.V.: *See—*
Schoen, Lowhardt A. A.; and Busschers, Franciscus A., 4,022,745.
Standard Brands Incorporated: *See—*
Sutthoff, Robert F.; and Nelson, William J., 4,022,637.
Standard Oil Company: *See—*
Griffith, Russell K., 4,022,957.
Selover, Theodore B., Jr.; and Boos, Donald L., 4,023,079.
Standard Oil Company (Indiana): *See—*
Connolly, John F.; and Flannery, Robert J., 4,022,673.
Knobloch, James O.; and Ramirez, Fausto, 4,022,817.
Stanfield, Charles Keith, to B. & J. Manufacturing Company. Tire trimmer and blades therefor. 4,021,912, Cl. 30-280.000.
Stanford Research Institute: *See—*
Anbar, Michael, 4,022,876.
Stanley, Leonard A.: *See—*
Swallow, Roger T.; and Stanley, Leonard A., 4,021,860.
Stanley, Max W., to General Electric Company. Composite blade employing biased layup. 4,022,547, Cl. 416-230.000.
Staples, Crawford E., to Westinghouse Air Brake Company. Railroad traffic control signaling system. 4,022,407, Cl. 246-34.00R.
Staples, Crawford E., to Westinghouse Air Brake Company. Track circuits with cab signals for dual gage railroads. 4,022,408, Cl. 246-34.00R.
Staudinger, Gernot, to Shell Internationale Research Maatschappij B.V. Coal gasification apparatus. 4,022,591, Cl. 48-76.000.
Stauffer Chemical Company: *See—*
Balfanz, Wayne J.; and Steinreich, Joseph S., 4,022,704.
Jin, Jung Il; and Kraft, Paul, 4,022,849.
Stauffer, Harry C.: *See—*
Bludis, Joseph A.; Lyzinski, David; McKinney, Joel D.; Sebulsky, Raynor T.; and Stauffer, Harry C., 4,022,682.
Bludis, Joseph A.; Lyzinski, David; McKinney, Joel D.; Sebulsky, Raynor T.; and Stauffer, Harry C., 4,022,683.
Stavis, Gus, to Singer Company, The. Microwave velocity sensor using altimeter echo. 4,023,171, Cl. 343-8.000.
Stearns, Stanley D.: *See—*
Ramin, James A.; and Stearns, Stanley D., 4,022,065.
Stegall, Richard D., to Suntech, Inc. Ice cutter having injection of low density fluid. 4,022,142, Cl. 114-42.000.
Steidley, Roy B., to American Hospital Supply Corporation. Ported closure and connector therefor. 4,022,258, Cl. 141-330.000.
Stein, David. Drip urinal. 4,022,213, Cl. 128-295.000.
Stein, Robert George; and Couch, Terry Lee, to Abbott Laboratories. α-Thienyl and α-substituted thienyl, phenyl and substituted phenyl cyclopropylomethanols useful as biodegradable insecticides and mollusicides. 4,022,903, Cl. 424-275.000.
Stein, Rudolf; and Schmitt, Werner, to Drahtwarenfabrik Drahtzug Stein KG. Spooling machine system and method to wind multi-layer spools, particularly for wire, tape and the like. 4,022,391, Cl. 242-25.00R.
Steinbeck, Edmund: *See—*
Roeder, Erwin; and Steinbeck, Edmund, 4,022,603.
Steiner, Josef: *See—*
Eckert, Konrad; Steiner, Josef; Zeilinger, Klaus; and Eidtmann, Helmut, 4,022,165.
Steinreich, Joseph S.: *See—*
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Stelzner, Klaus: *See—*
Langenfeld, Wilhelm; and Stelzner, Klaus, 4,022,445.
Stephens, Richard R.: *See—*
Lingenhole, Bernhard; and Stephens, Richard R., 4,021,919.
Stephenson, Donald K., to Outboard Marine Corporation. Exhaust muffler having an attenuater can assembly. 4,022,291, Cl. 181-53.000.
Sterling Drug Inc.: *See—*
Albertson, Noel F., 4,022,789.
Albertson, Noel F.; and Michne, William F., 4,022,792.
Diana, Guy D.; and Cutler, Royal A., 4,022,833.
Sterzel, Hans-Josef: *See—*
Schlichting, Karl; Horn, Peter; Wurmb, Rolf; Cordes, Claus; and Sterzel, Hans-Josef, 4,022,748.
Stevens, Richard: *See—*
Parker, David William; Penna, David Edward; Smith, Frederick Warren; and Stevens, Richard, 4,023,124.
Stevens, Robert C. Urological catheter. 4,022,216, Cl. 128-349.00B.
Stevenson, Robert H., to Megatherm Corporation. Computerized peak-shaving system for alleviating electric utility peak loads. 4,023,043, Cl. 307-38.000.
Stewart, David S., to Zenith Radio Corporation. Push-button video disc hub. 4,022,478, Cl. 274-10.00S.
Stewart-Warner Corporation: *See—*
Brouwer, Frans, 4,022,016.
Stierlein, Gerard, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Devices for tying a layer of threads or slivers. 4,021,896, Cl. 28-1.00R.
Stillman, Stephen L., Jr., to MFE Corporation. Thermal matrix type printing head. 4,023,184, Cl. 346-76.00R.
Stockman, Richard Franklin, to Air Preheater Company, Inc., The. Fire detector scanning arrangement. 4,022,270, Cl. 165-5.000.
Stoddard, Xerxes T.; and Terry, Ruel C. Thermal recovery of hydrocarbons by washing an underground sand. 4,022,280, Cl. 166-272.000.
Stoepel, Kurt: *See—*
Meyer, Horst; Bossert, Friedrich; Vater, Wulf; and Stoepel, Kurt, 4,022,898.
Stolzer, Myron M. Picture kit. 4,021,936, Cl. 35-26.000.
Stone, Jack P., to United States of America, Navy. Stemless bantam valve. 4,022,422, Cl. 251-118.000.
Storey, Stanley Herbert, to Berkey Photo, Inc. Luminaire. 4,023,031, Cl. 240-37.000.
Storms, Phillip W.: *See—*
Farrar, Grover L.; and Storms, Phillip W., 4,022,827.
Stotzel, Lothar; and Heider, Dieter. Process and apparatus for the cutting of transformer core sheets. 4,022,088, Cl. 83-34.000.
Strangio, Christopher E. Computer-aided musical apparatus and method. 4,022,097, Cl. 84-1.030.
Strathearn Audio Limited: *See—*
Ridler, Keith Douglas; Edge, Gordon Malcolm; and Whelan, Robert Charles, 4,023,130.
Strathman, Lyle R.; Bolin, Robert A.; Collins, Vincent B.; and Swanson, Ronald L., to Rockwell International Corporation. Circle/-graphics CRT deflection generation using digital techniques. 4,023,027, Cl. 235-152.000.
Strauff, Gunther, to Langen & Co. Hydraulic pressure-regulating system. 4,022,110, Cl. 91-371.000.
Strausser, Wilson L.; and Mast, Aquila D., to Sperry Rand Corporation. Controlling the size of a roll core formed in a crop material roll forming machine. 4,022,003, Cl. 56-341.000.
Strickland, Robert V. Drapery pleating guide for sewing machines. 4,022,138, Cl. 112-146.000.
Strike, Donald Peter, to American Home Products Corporation. 15-Substituted prostanoic acid. 4,022,821, Cl. 260-514.00D.
Strong, Bernard. Machine for manufacturing plastics bottles and other hollow articles. 4,022,561, Cl. 425-326.00B.
Stuart, Jerry E.: *See—*
Meyer, Roy E.; and Stuart, Jerry E., 4,022,195.
Stulemeijer, Eric Henricus Jozef Maria: *See—*
van Kessel, Theodorus Jozef; Stulemeijer, Eric Henricus Jozef Maria; Pieper, Johannes Maria; and Bloemen, Hendrikus Franciscus Bonifatius, 4,023,099.
Sturtz, Charles Robert, Jr., to Clark Equipment Company. Tree shear. 4,022,259, Cl. 144-34.00E.
Stutzke, Paul: *See—*
Lohmar, Elmar; Gehrmann, Klaus; Ohorodnik, Alexander; and Stutzke, Paul, 4,022,826.
Sugeno, Katsuhiko; and Yamami, Toshimi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for producing arcuately curved film casings. 4,022,860, Cl. 264-95.000.
Sugimoto, Yutaka: *See—*
Toyomura, Akihiro; Sugimoto, Yutaka; and Shiota, Ryoji, 4,022,432.
Sugisawa, Ko: *See—*
Sakakibara, Sakuichi; Sugisawa, Ko; Yamamoto, Masanori; Kimura, Takashi; and Sekiguchi, Kazuya, 4,022,921.
Sugizaki, Atsushi: *See—*
Okumura, Akio; Sugizaki, Atsushi; Ichijima, Seiji; Shiba, Keisuke; and Nakazyo, Kiyoshi, 4,022,620.
Suh, John T.; and Schnettler, Richard A., to Richardson-Merrell Inc. L-3-hydroxymethyltyrosine and salts thereof for lowering blood pressure. 4,022,910, Cl. 424-319.000.
Sukhinin, Viktor Pavlovich: *See—*
Garkusha, Anatoly Viktorovich; Shnee, Yakov Isidorovich; Ponkratova, Anna Grigorievna; Sukhinin, Viktor Pavlovich; Arkadiev, Boris Abramovich; and Moskvina, Ljudmila Dmitrievna, 4,022,544.
Sullivan, Thomas A.: *See—*
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Sulzer Brothers Limited: *See—*
Bucher, Robert, 4,022,251.
Sumitomo Metal Mining Co., Limited: *See—*
Arakatsu, Akira; Nakazawa, Hajime; and Naruse, Hiroshi, 4,022,686.
Sumitomo, Yuji: *See—*
Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Aiba, Masahiko; and Maezawa, Tokio, 4,023,183.
Sun Chemical Corporation: *See—*
Rosen, George, 4,022,674.
Sun Company, Inc.: *See—*
Angstadt, Howard P.; and Griffin, William P., Jr., 4,022,841.
Sun Oil Company of Pennsylvania: *See—*
Barrow, William J.; Fromnick, Stephen M.; and Mayer, Robert, 4,023,102.
Sunbeam Corporation: *See—*
Churas, Algerd C.; MacLagan, Robert T.; and Hemrich, William R., 4,021,930.
Sunds Aktiebolag: *See—*
Engstrom, Hans-Erik Rye; and Pettersson, Bengt Edvard, 4,022,654.
Sundwiger Eisenhutte Maschinenfabrik Grah & Co.: *See—*
Sporenberg, Willi; and Klockenhoff, Herbert, 4,022,367.
Suntech, Inc.: *See—*
Stegall, Richard D., 4,022,142.
Suovaniemi, Osmo Antero; and Tervamaki, Jukka Topias, to Suovaniemi, Osmo Antero. Centrifuge. 4,022,375, Cl. 233-1.00R.
Sussman, Alan, to RCA Corporation. Liquid crystal device with louver means located behind the liquid crystal device. 4,021,945, Cl. 40-28.00C.

Sutthoff, Robert F.; and Nelson, William J., to Standard Brands Incorporated. Method for separation of water soluble carbohydrates. 4,022,637, Cl. 127-46.00A.

Suyama, Hisao, to Sanyo Electric Co., Ltd.; and Tokyo Sanyo Electric Co., Ltd. Radio-controlled vehicle with RF noise elimination feature and with ultrasonic anti-collision means insensitive to mechanical shocks. 4,023,178, Cl. 343-225.000.

Suzue, Seisuke: *See—*
Yoshimura, Tatsushiro; Suzue, Seisuke; Tominaga, Shigetake; Namba, Mutsusuke; and Mizuno, Toshio, 4,022,742.

Suzuki, Hiroshi: *See—*
Takeya, Kenji; Suzuki, Hiroshi; and Ichimaru, Tadashi, 4,022,750.

Suzuki, Norishige: *See—*
Ando, Takao; Fujikura, Hiroshi; Suzuki, Norishige; and Watanabe, Akira, 4,022,368.

Suzuki, Toshiharu: *See—*
Nakagome, Keisuke; and Suzuki, Toshiharu, 4,022,649.

Svensson, Kjell: *See—*
Juhlin, Lars Erik; and Svensson, Kjell, 4,023,087.

Svoboda, Josef: *See—*
Weigl, Erwin; and Svoboda, Josef, 4,022,493.

Swain, Kenneth W., to Gould Inc. Electric Fuse Division. Electric fuse having multiple current paths connected in parallel. 4,023,134, Cl. 337-293.000.

Swallow, Roger T.; and Stanley, Leonard A., to Kendall Company, The. Non-slip therapeutic stocking and method. 4,021,860, Cl. 2-239.000.

Swanson, Raymond Nicholas: *See—*
Rasicci, Vincent Martion; Swanson, Raymond Nicholas; and Clotz, Paul Arthur, 4,022,734.

Swanson, Ronald L.: *See—*
Strathman, Lyle R.; Bolin, Robert A.; Collins, Vincent B.; and Swanson, Ronald L., 4,023,027.

Sweeney, John F. Giant hay baler. 4,022,002, Cl. 56-341.000.

Sweet, Anthony William: *See—*
Kitajewski, Ryszard; Sweet, Anthony William; and Dyer, Michael Philip, 4,022,980.

Swift, Harold E.: *See—*
Beuther, Harold; Kehl, William L.; and Swift, Harold E., 4,022,839.
Black, Edgar R.; Montagna, Angelo A.; and Swift, Harold E., 4,022,684.
Kobylinski, Thaddeus P.; and Swift, Harold E., 4,022,810.

Swingline, Inc.: *See—*
Barrett, Edward E.; and Failla, Stephen J., 4,022,325.

Swiss Aluminium Ltd.: *See—*
Dean, Sheldon W., 4,022,670.

Sybron Corporation: *See—*
Fassler, Werner A., 4,023,190.

Sydansk, Robert D.: *See—*
Dreher, Karl D.; and Sydansk, Robert D., 4,022,276.

Systems, Science and Software: *See—*
Kirsch, Jeffrey W.; and Day, Edward A., 4,022,508.

Szymber, Oleg, to Southwestern Industries, Inc. Machines for centerless cold rolling of gears. 4,022,044, Cl. 72-108.000.

T. Sendzimir, Inc.: *See—*
Turley, John W., 4,022,040.

Tachikawa, Ryuji; Miyadera, Tetsuo; Terada, Atsusuke; Kamioka, Toshiharu; and Naruto, Syunji, to Sankyo Company Limited. 2-Aminoacetamido-α-phenylbenzylideneaminoalkanol derivatives and process for the preparation thereof. 4,022,832, Cl. 260-562.00N.

Taft, Philip Augustus, to Girling Limited. Valve assemblies for vehicle hydraulic braking systems. 4,022,111, Cl. 91-372.000.

Tait, Robert Allan Reid: *See—*
McKinlay, William Hall; and Tait, Robert Allan Reid, 4,022,969.

Takahashi, Soroku, to Kyuroku Kabushiki-Kaisha. Method of manufacturing an endless printing belt for a belt type printing apparatus. 4,021,906, Cl. 29-407.000.

Takahashi, Yoshio: *See—*
Konya, Kazumi; Konagai, Yoshihiro; Muto, Makoto; Sato, Hironari; and Takahashi, Yoshio, 4,022,605.

Takahasi, Riyota; Yamada, Takayosi; Kimura, Makoto; and Yosikawa, Seiji, to Nippon Steel Corporation. Method for enlarging the width of a cast piece in a continuous casting operation. 4,022,265, Cl. 164-73.000.

Takano, Rikuo; Sumitomo, Yuji; Yamamoto, Yoichi; Aiba, Masahiko; and Maezawa, Tokio, to Nippon Telegraph and Telephone Public Corporation; and Sharp Kabushiki Kaisha. Rotary deflection electrodes in an ink jet system printer. 4,023,183, Cl. 346-75.000.

Takeshita, Toru; Hashimoto, Yoshinobu; Kawashima, Hiroyuki; Ishimoto, Sachio; Ikekawa, Nobuo; and Morisaki, Masuo, to Teijin Limited. Novel 1α,24-dihydroxycholecalciferol compositions, novel precursors thereof, and processes for preparing them. 4,022,891, Cl. 424-236.000.

Takeya, Kenji; Suzuki, Hiroshi; and Ichimaru, Tadashi, to American Cyanamid Company. Process for the production of a halogen-containing arcylic synthetic fiber improved in flame retardancy. 4,022,750, Cl. 260-45.75H.

Takiura, Mamoru: *See—*
Kawamura, Yuzo; Takiura, Mamoru; and Hayashizaki, Yoshihiro, 4,022,440.

Takman, Bertil H.: *See—*
Adams, Herbert J. F.; and Takman, Bertil H., 4,022,899.

Tallerico, William A., to Graphic Controls Corporation. Disposable marker and holder. 4,023,186, Cl. 346-140.00A.

Talos Systems, Inc.: *See—*
Rodgers, James L., 4,022,971.

Talty, Bernard F.: *See—*
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Tamada, Shigeharu: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, 4,022,776.

Tamara, Shigeharu: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamara, Shigeharu, 4,022,784.

Tamazina, Valentina Nikolaevna: *See—*
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.

Tamm, Rolf Gunther Arnold: *See—*
Braun, Klaus; Chlosta, Wolfgang; Eier, Franz; Huber, Bernhard Werner; and Tamm, Rolf Gunther Arnold, 4,022,530.

Tamoni, Giorgio: *See—*
Parenti, Francesco; Coronelli, Carolina; Tamoni, Giorgio; and Lancini, Giancarlo, 4,022,884.

Tamura, Sachiko: *See—*
Hashimoto, Tohru; Kawarada, Akira; and Tamura, Sachiko, 4,022,842.

Tanaka, Akio, to Zenith Radio Corporation. Sequential channel tuning system with a memory. 4,023,107, Cl. 325-464.000.

Tanaka, Minoru; Tanaka, Yoshio; and Nagai, Akio, to Honda Giken Kogyo Kabushiki Kaisha. Control system for engine ignition timing. 4,022,169, Cl. 123-117.00A.

Tanaka, Shigemitsu, to Kabushiki Kaisha Shinko Giken. Device for cutting branches or canes. 4,021,997, Cl. 56-56.000.

Tanaka, Yasuzi: *See—*
Kurosawa, Shigeru; Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,022,954.

Tanaka, Yoshiaki, to Oki Electric Industry Company, Ltd. Key telephone system with a common push-button sender system. 4,022,985, Cl. 179-99.000.

Tanaka, Yoshio: *See—*
Tanaka, Minoru; Tanaka, Yoshio; and Nagai, Akio, 4,022,169.

Tanczyn, Harry, to Armco Steel Corporation. Process for cold-working and stress-relieving non-heat hardenable ferritic stainless steels. 4,022,640, Cl. 148-37.000.

Tani, Kenichi: *See—*
Tashiro, Megumi; Wada, Masamichi; Yamanaka, Toshio; and Tani, Kenichi, 4,022,627.

Tanigaichi, Mineaki; Motoori, Susumu; and Noguchi, Kazuo, to Mitsubishi Gas Chemical Company, Inc. Cyanato-group-containing phenol resin. 4,022,755, Cl. 260-59.00R.

Tanikoshi, Kinji, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha, part interest to each. Speed control circuit for a DC motor having a Hall generator. 4,023,082, Cl. 318-138.000.

Tanimoto, Kenji, to Fuji Xerox Co., Ltd. Phase synchronizing circuit. 4,023,080, Cl. 318-85.000.

Tanimura, Kaoru: *See—*
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamada, Shigeharu, 4,022,776.
Nakagawa, Kazuyuki; Yoshizaki, Shiro; Tanimura, Kaoru; and Tamara, Shigeharu, 4,022,784.

Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, to Nihon Nohyaku Co. Ltd. Pharmaceutical compositions containing 1,3-dithiacycloalkylidene malonates. 4,022,907, Cl. 424-277.000.

Tarzia, Giorgio: *See—*
Fontanella, Luigi; Mariani, Luigi; and Tarzia, Giorgio, 4,022,766.

Tashiro, Megumi; Wada, Masamichi; Yamanaka, Toshio; and Tani, Kenichi, to Owens-Illinois, Inc. Crystallizable glasses and nephetine glass-ceramics containing ZrO_2 and ZnO. 4,022,627, Cl. 106-39.600.

Tateno, Hiroshi: *See—*
Kataoka, Shoei; and Tateno, Hiroshi, 4,023,196.

Taylor, Allen L., to Minnesota Mining and Manufacturing Company. Strain sensor employing piezoelectric material. 4,023,054, Cl. 310-8.300.

Taylor, Arthur Edwin. Fuel atomizer and positive charging generator. 4,022,176, Cl. 123-141.000.

Taylor, Carol L., administratrix: *See—*
Taylor, Jack E., deceased; and Taylor, Carol L., administratrix, 4,023,032.

Taylor, Edmund P., to Bryant-Poff, Inc. Boot construction for a bucket elevator. 4,022,316, Cl. 198-860.000.

Taylor, George William: *See—*
Braun, Edwin Julius; Lane, Michael Stephen; Meise, Henry August, Jr.; and Taylor, George William, 4,022,983.

Taylor, Glenn R. Windsurfing training device. 4,021,934, Cl. 35-11.000.

Taylor, Jack E., deceased; and Taylor, Carol L., administratrix. Light standard for bicycles. 4,023,032, Cl. 240-58.000.

Taylor, Joel E., III: *See—*
McCall, Francis L.; and Taylor, Joel E., III, 4,021,986.

Taylor, Lloyd D.: *See—*
Fitzgerald, Maurice J.; Kolesinski, Henry S.; and Taylor, Lloyd D., 4,022,623.

Taylor, Theodore E.: *See—*
Stackhouse, Bill L.; and Taylor, Theodore E., 4,022,973.

TDK Electric Co., Ltd.: *See—*
Itou, Tomio; Ishikawa, Michio; and Furuse, Tokio, 4,023,128.

TDK Electronics Company, Limited: *See—*
Ueoka, Hisayoshi; and Yodogawa, Masatada, 4,022,716.

Technigaz: *See—*
Kotcharian, Michel, 4,021,982.

Tecumseh Products Company: *See—*
Bosma, David J., 4,022,180.

Teer, Kees; Janssen, Peter Johannes Michiel; and de Bot, Laurentius Antonius Peter Maria, to U.S. Philips Corporation. Playback unit for a long-playing record of a time division multiplexed audio signal. 4,022,986, Cl. 179-100.30B.

Teijin Limited: *See—*
Takeshita, Toru; Hashimoto, Yoshinobu; Kawashima, Hiroyuki; Ishimoto, Sachio; Ikekawa, Nobuo; and Morisaki, Masuo, 4,022,891.

Teledyne, Inc.: *See—*
Manchester, Edward A.; Talty, Bernard F.; and Hallstrom, Earle A., 4,022,396.

Teledyne Industries, Inc.: *See—*
Barbeau, Dennis E., 4,022,542.
Bart, Hans U., 4,022,166.

Telefonaktiebolaget L M Ericsson: *See—*
Duncker, Bodo Kurt Adolf; and Eberstein, Bo Soren Tage, 4,023,112.
Hemdal, Goran Anders Henrik, 4,022,982.

Teleglobe Pay TV System Inc.: *See—*
Pires, H. George, 4,022,972.

Telesciences, Inc.: *See—*
Connell, Joseph B.; Fillebrown, Stephen M.; Horwitz, Michael J.; and Watson, John C., 4,022,978.

Tenczar, Francis J. Fluid connectors. 4,022,205, Cl. 128-214.00R.

Teng, Robert N.; and Covey, William B., to United States of America, Air Force. Projectile guide track. 4,022,053, Cl. 73-12.000.

Tenneco Chemicals, Inc.: *See—*
Sidi, Henri; and Johnson, Hilding R., 4,022,906.

Teplinskaya, Tamara Konstantinovna: *See—*
Kononenko, Viktor Evmenievich; Kononenko, Nina Stepanovna; Tamazina, Valentina Nikolaevna; Baranova, Valentina Nikolaevna; Gaintsev, Viktor Andreevich; Kuzin, Alexandr Jurievich; Pankov, Gennady Ivanovich; Fishman, Boris Isaakovich; and Teplinskaya, Tamara Konstantinovna, 4,021,911.

Terada, Atsusuke: *See—*
Tachikawa, Ryuji; Miyadera, Tetsuo; Terada, Atsusuke; Kamioka, Toshiharu; and Naruto, Syunji, 4,022,832.

Terasaki, Wesley L.: *See—*
Brooker, Gary; Terasaki, Wesley L.; and Price, Michael G., 4,022,577.

Terrac Company Limited: *See—*
Bove, Fred, 4,022,739.

Terry, Ruel C.: *See—*
Stoddard, Xerxes T.; and Terry, Ruel C., 4,022,280.

Tervamaki, Jukka Topias: *See—*
Suovaniemi, Osmo Antero; and Tervamaki, Jukka Topias, 4,022,375.

Teti, John J. Headlight mount for mine vehicle. 4,023,030, Cl. 240-8.200.

Tetzner, Siegfried K. Marine structures. 4,022,027, Cl. 61-65.000.

Texaco Development Corporation: *See—*
Watts, Lewis W., Jr., 4,022,830.

Texaco Inc.: *See—*
Allen, Joseph C., 4,022,278.
Canup, Robert E.; and Faist, Clifford H., 4,022,177.
Flournoy, Norman E.; Morris, David A.; and Agnew, Robert J., 4,022,055.
Morduchowitz, Abraham; and Bialy, Jerzy Jozef, 4,022,590.

Texas Instruments Incorporated: *See—*
Buss, Dennis D., 4,023,170.
Currie, Harry A.; and Heathcock, William F., 4,023,176.

Textron, Inc.: *See—*
Drees, Jan M.; Gravley, Arthur D.; Palachek, Charles V.; and Spencer, James L., 4,022,546.

Then, Eugene Robert: *See—*
Schweitzer, Raymond Louis; Then, Eugene Robert; and Pool, Eldert Bergen, 4,022,247.

Thermo-Mold Medical Products, Inc.: *See—*
Castiglia, Ignatius F., 4,022,197.

Thijs, Victor Jan: *See—*
Timmerman, Daniel Maurice; Thijs, Victor Jan; De Winter, Walter Frans; Claes, Frans Henri; and Vandenabeele, Hubert, 4,022,622.

Thomas, Ramon L. Sectional support fence. 4,022,436, Cl. 256-24.000.

Thomas, William A., Jr.; and Baugh, James C., Jr., to Eastman Kodak Company. Apparatus for removing packages from textile yarn winder. 4,022,392, Cl. 242-41.000.

Thompson, Larry Flack: *See—*
Feit, Eugene David; and Thompson, Larry Flack, 4,023,208.

Thompson, Neil E. S.: *See—*
Oude Alink, Bernardus A.; and Thompson, Neil E. S., 4,022,785.

Thompson, Stephen A.: *See—*
Brink, Robert A.; Ertel, Richard L.; and Thompson, Stephen A., 4,022,550.

Thompson, Thomas D., to Yara Engineering Corporation. Color developing coating compositions containing reactive pigments particularly for manifold copy paper. 4,022,735, Cl. 260-29.70W.

Thomson-Brandt: *See—*
Bricot, Claude; and Lehureau, Jean Claude, 4,023,033.

Thomson-CSF: *See—*
Galves, Jean Pierre; and Sagnard, Jean, 4,023,039.
Hartemann, Pierre, 4,023,120.

Timex Corporation: *See—*
Lowdenslager, John R., 4,022,014.
Willis, Alan E.; and Schwarzschild, Jack, 4,021,898.
Wuthrich, Paul; and Mascia, Frank P., 4,023,002.

Timmerman, Daniel Maurice; Thijs, Victor Jan; De Winter, Walter Frans; Claes, Frans Henri; and Vandenabeele, Hubert, to AGFA-GEVAERT N.V. Dispersing polymeric particles in aqueous medium for coating silver halide emulsion layers. 4,022,622, Cl. 96-67.000.

Timmons, Terry K.; and Endres, Dan D., to Kimberly-Clark Corporation. Wetness indicator for absorbent pads. 4,022,211, Cl. 128-287.000.

Tindal, Bobby G. Controlled one man boat. 4,022,145, Cl. 114-153.000.

Tingley, Albert Sanford: *See—*
Rake, Robert Wayne; Tingley, Albert Sanford; and Walter, Thomas Arthur, 4,022,153.

Tinney, Francis John; and Campbell, Alfred, to Parke, Davis & Company. Tripeptides and methods for their production. 4,022,759, Cl. 260-112.5LH.

Tinney, Francis John, to Parke, Davis & Company. Tripeptides and methods for their production. 4,022,760, Cl. 260-112.5LH.

Tinney, Francis John; Nicolaides, Ernest D.; Hutt, Marland Paul; and Mich, Thomas Frederick, to Parke, Davis & Company. Tripeptides and methods for their production. 4,022,761, Cl. 260-112.5LH.

Tisseau, Michel. Method of separating products of different density and apparatus for carrying out the method. 4,022,685, Cl. 209-157.000.

Tobita, Takashi: *See—*
Yoshihara, Hiroshi; Tobita, Takashi; Tomizawa, Ryoichi; and Ishikawa, Kunio, 4,022,808.

Todd, Irma L. Golf training aid. 4,022,475, Cl. 273-183.00B.

Tokico Ltd.: *See—*
Haraikawa, Tetsuo, 4,022,297.
Haraikawa, Tetsuo, 4,022,299.

Tokyo Electric Power Co., Ltd.: *See—*
Ishida, Yotsuo; and Kuwahara, Hiroshi, 4,023,076.

Tokyo Sanyo Electric Co., Ltd.: *See—*
Suyama, Hisao, 4,023,178.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Hirano, Hitoshi; and Fukuda, Tsuguo, 4,022,652.
Nakajima, Shunichi; Kobayashi, Nobuo; and Ariga, Yoshio, 4,023,011.
Shimizu, Shoichi; and Yamada, Hisashi, 4,023,053.
Torii, Kenichi, 4,023,108.

Toland, William D.; Westgate, Bernard C., Jr.; and Burks, Kenneth N., Jr., to Bradbar Mfg. Corporation. Folding display rack. 4,022,328, Cl. 211-149.000.

Tominaga, Shigetake: *See—*
Yoshimura, Tatsushiro; Suzue, Seisuke; Tominaga, Shigetake; Namba, Mutsusuke; and Mizuno, Toshio, 4,022,742.

Tomizawa, Ryoichi: *See—*
Yoshihara, Hiroshi; Tobita, Takashi; Tomizawa, Ryoichi; and Ishikawa, Kunio, 4,022,808.

Tomlinson Industries, Inc.: *See—*
Basel, Donald R.; and Kawolics, Raymond P., 4,022,062.

Tompkins, James Darrell, to International Business Machines Corporation. Self-scanning photo-sensitive circuits. 4,023,048, Cl. 307-246.000.

Tonka Corporation: *See—*
Good, Thomas W., 4,021,961.

Torii, Kenichi, to Tokyo Shibaura Electric Co., Ltd. Electronically controllable tuning device having a frequency synthesizer. 4,023,108, Cl. 325-464.000.

Toshiba Kikai Kabushiki Kaisha: *See—*
Segawa, Kazuyoshi, 4,022,269.

Toyoda Koki Kabushiki Kaisha: *See—*
Owa, Kaoru, 4,023,084.

Toyomura, Akihiro; Sugimoto, Yutaka; and Shiota, Ryoji, to Kabushiki Kaisha Komatsu Seisakusho. Power transmission in double-drum winch. 4,022,432, Cl. 254-185.00B.

Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kondo, Toshio; Mori, Yoshinori; and Ishikawa, Masakazu, 4,022,303.

Trame, Charles E., to Everbrite Electric Signs, Inc. Display device with orbitally movable plates. 4,021,944, Cl. 40-28.00C.

Trebillon, Emile: *See—*
Regeaud, Jean-Pierre; Trebillon, Emile; and Wetroff, Georges, 4,022,812.

Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 4-Piperazinyl derivatives of pyrazolo [1,5-a]-quinoxaline-3-carboxylic acids and esters. 4,022,782, Cl. 260-268.0TR.

Tri-Mark Metal Corporation: *See—*
Krueger, Robert A., 4,022,385.

Trost, Wayne C., to Barber-Colman Company. Rapiers with guide means for use in a vertical weaving machine. 4,022,250, Cl. 139-18.000.

Trost, Wayne C., to Barber-Colman Company. Rapiers with means for limiting rapier head divergence during weft-yarn transfer. 4,022,253, Cl. 139-446.000.

Trotter, Jimmy R.; and Petke, Frederick D., to Eastman Kodak Company. Hot melt pressure sensitive adhesives. 4,022,728, Cl. 260-27.00R.

Trumbly, Terry A.: *See—*
Grubb, Albany D.; Mosakowski, Thomas S.; and Trumbly, Terry A., 4,022,947.
TRW Inc.: *See—*
Speyer, Fred B., 4,022,727.
Tsuchimochi, Yoshihisa: *See—*
Mabuchi, Kenichi; and Tsuchimochi, Yoshihisa, 4,022,074.
Tsui, Frank: *See—*
Schuenemann, Claus; and Tsui, Frank, 4,023,147.
Tsujino, Yoshiaki; Miyashita, Masahiko; and Hashimoto, Tokio, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Process for preparing sorbic acid. 4,022,822, Cl. 260-526.00N.
Tsukada, Nobuo, to Kabushiki Kaisha Daini Seikosha. Mounting device for a quartz tuning fork. 4,023,055, Cl. 310-9.100.
Tuchimoto, Kazunori: *See—*
Hori, Hiroshi; and Tuchimoto, Kazunori, 4,022,315.
Tuka, Richard F.; Vossos, Peter H.; Nielsen, Ralph R.; and Guardia, Carl J., to Nalco Chemical Company. Continuous process for the preparation of a cationically modified acrylamide polymer. 4,022,741, Cl. 260-29.4UA.
Turbak, Albin F.; Hammer, Richard B.; Portnoy, Norman A.; and Davies, Richard E., to International Telephone and Telegraph Corporation. Process for producing regenerated cellulosic articles. 4,022,631, Cl. 106-168.000.
Turecek, Kvetoslav, to Danfoss A/S. Shower control valve assembly. 4,022,242, Cl. 137-270.000.
Turley, John W., to T. Sendzimir, Inc. Method of operation and control of crown adjustment system drives on cluster mills. 4,022,040, Cl. 72-10.000.
Turney, Larry R., to Victor Equipment Company. Universal torch. 4,022,441, Cl. 266-48.000.
Tuten, Richard K.; Barron, Richard J.; and Venable, Lawrence B., to General Electric Company. Mounting system for a thrust generating engine. 4,022,018, Cl. 60-200.00R.
Tyagunov, Vladimir Arkadievich: *See—*
Korshunov, Evgeny Alexeevich; Freidenzon, Evgeny Zakharovich; Tyagunov, Vladimir Arkadievich; Fedorov, Mikhail Ivanovich; Kalinin, Alexandr Ivanovich; Malikov, Konstantin Alexeevich; Arshansky, Mikhail Iosipovich; Petrov, Igor Nikolaevich; and Melnikov, Evgeny Valentinovich, 4,022,048.
UARCO Incorporated: *See—*
Davis, Charles C., 4,022,364.
Uchida, Yasuo: *See—*
Ano, Shizuya; and Uchida, Yasuo, 4,023,012.
Uchimoto, Yoshikazu, to Kobe Steel Ltd. Driving apparatus for oscillation of a mold within a continuous casting machine. 4,022,082, Cl. 74-570.000.
Ueda, Hiroshi; and Matsuda, Motonobu, to Minolta Camera Kabushiki Kaisha. Electronic flash device for a camera. 4,023,188, Cl. 354-33.000.
Ueki, Hiroshi, to Kurita Water Industries Ltd. Method for removing carbon scale. 4,022,639, Cl. 134-2.000.
Ueoka, Hisayoshi; and Yodogawa, Masatada, to TDK Electronics Company, Limited. Semiconducting ceramics containing vanadium oxide. 4,022,716, Cl. 252-520.000.
Ueshima, Takashi: *See—*
Kurosawa, Shigeru; Ueshima, Takashi; Tanaka, Yasuzi; and Kobayashi, Shoichi, 4,022,954.
Ujvari, Georg; and Hansen, Peter Bregnedal, to Kefalas A/S. Xanthene and thioxanthene compositions and method of treating. 4,022,896, Cl. 424-250.000.
Uncapher, Charles A.: *See—*
Christensen, Kenneth K.; and Uncapher, Charles A., 4,022,154.
Underwood, David W.: *See—*
Schuder, Maurice E.; Underwood, David W.; and Weber, Richard H., 4,022,075.
Union Carbide Corporation: *See—*
Prokai, Bela; and Kanner, Bernard, 4,022,722.
Prokai, Bela; and Kanner, Bernard, 4,022,941.
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Union International Company Ltd., The: *See—*
Frost, Henry Francis; Fabian, Fritz; Sharpe, Christopher James; and Jones, William Arthur, 4,022,806.
Union Oil Company of California: *See—*
Holm, LeRoy W., 4,022,699.
United Kingdom Atomic Energy Authority: *See—*
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Air Force: *See—*
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Day, John E.; and La Force, Phil D., 4,022,129.
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U.S. Philips Corporation: *See—*
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van Kessel, Theodorus Jozef; Stulemeijer, Eric Henricus Jozef Maria; Pieper, Johannes Maria; and Bloemen, Hendrikus Franciscus Bonifatius, 4,023,099.
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United States Steel Corporation: *See—*
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United Technologies Corporation: *See—*
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Universal Maschinenfabrik Dr. Rudolf Schieber KG: *See—*
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Universal Oil Products Company: *See—*
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Universal Research Laboratories, Inc.: *See—*
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University of California, The Regents of the: *See—*
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University Patents, Inc.: *See—*
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USV Pharmaceutical Corporation: *See—*
Shroff, James R.; and Cervoni, Peter P., 4,022,783.
Utsunomiya, Keisuke, to Matsushita Electric Industrial Co., Ltd. Input circuit of VHF television set tuner. 4,023,106, Cl. 325-462.000.
Valdo, Alex R., to Ethyl Corporation. Method of refining aluminum-silicon alloys. 4,022,614, Cl. 75-63.000.
Vallere, Donald J.: *See—*
Roth, Marvin E.; and Vallere, Donald J., 4,022,939.
Valtchev, Konstantin L. Gynecologic instrument. 4,022,208, Cl. 128-239.000.
Valti Societe Anonyme pour la Fabrication de Tubes Roulements: *See—*
Chevet, Michel, 4,022,043.
Van Epps Design and Development Co., Inc., The: *See—*
Shreve, Richmond B., 4,023,109.
van Assendelft, Leendert, to Akzo N.V. Metallic cable. 4,022,009, Cl. 57-145.000.
Vandas, Edward B., to McGraw-Edison Company. Kitchen ventilator grease extractor construction. 4,022,118, Cl. 98-115.00K.
Vandenabeele, Hubert: *See—*
Timmerman, Daniel Maurice; Thijs, Victor Jan; De Winter, Walter Frans; Claes, Frans Henri; and Vandenabeele, Hubert, 4,022,622.
van den Beld, Paul Christiaan Herman, to Wavin B.V. Adhesive connection for plastic pipes. 4,022,500, Cl. 285-332.000.

van den Ouweland, Godefridus Antonius Maria: *See—*
Doornbos, Tamme; and van den Ouweland, Godefridus Antonius Maria, 4,022,920.

Vandling, John M., to Exxon Research and Engineering Company. Facsimile receiver with improved FM demodulator. 4,022,970, Cl. 358-298.000.

Van Gompel, James J. Portable tree stand or crows nest. 4,022,292, Cl. 182-33.000.

van Kessel, Theodorus Jozef; Stulemeijer, Eric Henricus Jozef Maria; Pieper, Johannes Maria; and Bloemen, Hendrikus Fransiscus Bonifatius, to U.S. Philips Corporation. Circuit arrangement for measuring the effective value of an electric signal. 4,023,099, Cl. 324-105.000.

Vanostrand, Paul. Film strip carriers. 4,021,951, Cl. 40-159.000.

VanVloten, Curtis P.: *See—*
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Van Wagoner, John D., to Barlow, Robert M., a part interest. Insulated water impermeable roofing system. 4,021,981, Cl. 52-309.130.

Varian Associates: *See—*
Berwick, Albert Edward; and Miram, George Valentine, 4,023,061.
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Varo, Inc.: *See—*
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VEB Nahmaschinenwerk Wittenberge: *See—*
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Velsicol Chemical Corporation: *See—*
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Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See—*
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Vermont Marble Company: *See—*
Bartenstein, Michael F., 4,022,141.

Vernaleken, Hugo: *See—*
Bottenbruch, Ludwig; Kampf, Gunther; Serini, Volker; and Vernaleken, Hugo, 4,022,944.

Vershinsky, Georgy Ottovich; Perfiliev, Evgeny Alexeevich; and Kharlan, Georgy Dmitrievich. Installation for electrohydraulic knockout of casting cores. 4,022,266, Cl. 164-250.000.

Victor Equipment Company: *See—*
Turney, Larry R., 4,022,441.

Vidal, Stephen. Grip for implement handle. 4,022,470, Cl. 273-81.500.

Vigreux, Jacques: *See—*
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Vinson, Leonard J.; and Cancro, Lewis P., to Lever Brothers Company. Anticalculus composition. 4,022,880, Cl. 424-49.000.

Vinton, Clarence S.; and Franklin, Charles H., to Chemotronics International, Inc. Method for the preparation of vitreous carbon foams. 4,022,875, Cl. 423-445.000.

Vitatron Medical B.V.: *See—*
Renirie, Alexis C. M., 4,023,046.

Voegeli, Otto, to International Business Machines Corporation. Bubble translation system. 4,023,150, Cl. 340-174.0TF.

Vogel, Christian; and Aebi, Rudolf, to Ciba-Geigy Corporation. Plant growth regulating agent. 4,022,611, Cl. 71-118.000.

Vogt, B. Richard: *See—*
Sowinski, Francis Alexander; and Vogt, B. Richard, 4,022,774.
Wade, Peter C.; and Vogt, B. Richard, 4,022,765.

Voigt, Gerhard, to Volkswagenwerk Aktiengesellschaft. Impact damping system and suspension therefor. 4,022,451, Cl. 267-116.000.

Volkov, Nikolai Vasilievich: *See—*
Zhiklenkox, Viktor Konstantinovich; Ilin, Viktor Mikhailovich; Martynenkov, July Fedorovich; Petukhov, Nikolai Kuzmich; and Volkov, Nikolai Vasilievich, 4,022,085.

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Voigt, Gerhard, 4,022,451.

Vollmer, Hartfrid, to Hoechst Aktiengesellschaft. Process for making phosphorus sulfamides. 4,022,852, Cl. 260-970.000.

Volpe, Richard L.; and Wheeler, Claude, to Rockwell International Corporation. Weft yarn control device. 4,022,254, Cl. 139-453.000.

Vona, Joseph A.: *See—*
Patella, Ralph F.; and Vona, Joseph A., 4,022,743.

von der Crone, Jost: *See—*
L'Eplattenier, Francois; Pugin, Andre; and von der Crone, Jost, 4,022,770.

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B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 141,968	4,013,442	Mar. 30, 1976	Mar. 22, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538 491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	UB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976				

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 10TH DAY OF MAY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Alloy Surfaces Company, Inc.: *See*—
Baldi, Alfonso L.; and Damiano, Victor V., Re. 29,212.

Anazawa, Shinzo; Ueno, Seiichi; Nagasako, Isamu; and Sando, Shigeru, to Nippon Electric Company, Limited. Packaged semiconductor device for microwave use. Re. 29,218, Cl. 357-80.000.

ASEA AB: *See*—
Nilsson, Jan, Re. 29,205.

Baldi, Alfonso L.; and Damiano, Victor V., to Alloy Surfaces Company, Inc. Pack diffusion coating of metals. Re. 29,212, Cl. 427-253.000.

Bell Telephone Laboratories, Incorporated: *See*—
Carney, Adam Carroll; Cichetti, Michael Peter, Jr.; Kneuer, Joseph George; and Rice, Donald Wesley, Re. 29,215.

Bolduc, Lee R.; and Dickhudt, Eugene A., to Population Research Incorporated. Dispensing method and apparatus. Re. 29,207, Cl. 128-235.000.

Carney, Adam Carroll; Cichetti, Michael Peter, Jr.; Kneuer, Joseph George; and Rice, Donald Wesley, to Bell Telephone Laboratories, Incorporated. Cross-office connecting scheme for interconnecting multiplexers and central office terminals. Re. 29,215, Cl. 179-15.0BA.

Carugati, Vitaliano: *See*—
Colombo, Sergio; Carugati, Vitaliano; Ferramola, Gianni; and Ferrari, Sergio, Re. 29,216.

Cichetti, Michael Peter, Jr.: *See*—
Carney, Adam Carroll; Cichetti, Michael Peter, Jr.; Kneuer, Joseph George; and Rice, Donald Wesley, Re. 29,215.

Colombo, Sergio; Carugati, Vitaliano; Ferramola, Gianni; and Ferrari, Sergio, to Raytheon Company. Radiographic display system with cassette lock. Re. 29,216, Cl. 250-320.000.

Damiano, Victor V.: *See*—
Baldi, Alfonso L.; and Damiano, Victor V., Re. 29,212.

Dickhudt, Eugene A.: *See*—
Bolduc, Lee R.; and Dickhudt, Eugene A., Re. 29,207.

Eastman Kodak Company: *See*—
Perez-Albuerne, Evelio A., Re. 29,210.

Ferramola, Gianni: *See*—
Colombo, Sergio; Carugati, Vitaliano; Ferramola, Gianni; and Ferrari, Sergio, Re. 29,216.

Ferrari, Sergio: *See*—
Colombo, Sergio; Carugati, Vitaliano; Ferramola, Gianni; and Ferrari, Sergio, Re. 29,216.

Higo, Yoshiki, to Nippon Electric Company, Limited. Digital circuit. Re. 29,217, Cl. 307-288.000.

Jaffa, David, to Precision Screen Machines Inc. Vacuum pallet type screen printing machine with registration means. Re. 29,206, Cl. 101-407.00R.

Kabushiki Kaisha Seisan Nihon Sha: *See*—
Naito, Kakuji, Re. 29,208.

Keating, John T.: *See*—
Zalewski, Edmund J.; Simonian, John L.; and Keating, John T., Re. 29,213.

Kneuer, Joseph George: *See*—
Carney, Adam Carroll; Cichetti, Michael Peter, Jr.; Kneuer, Joseph George; and Rice, Donald Wesley, Re. 29,215.

Lewis, Richard Newton, to SWS Silicones Corporation. Alkoxysiloxanols. Re. 29,211, Cl. 260-448.80R.

Nagasako, Isamu: *See*—
Anazawa, Shinzo; Ueno, Seiichi; Nagasako, Isamu; and Sando, Shigeru, Re. 29,218.

Naito, Kakuji, to Kabushiki Kaisha Seisan Nihon Sha. Method and apparatus for manufacturing synthetic resin tubular film having occludent means in the inside surface thereof. Re. 29,208, Cl. 156-91.000.

Nilsson, Jan, to ASEA AB. Press for hydrostatic extrusion of tubes. Re. 29,205, Cl. 72-60.000.

Nippon Electric Company, Limited: *See*—
Anazawa, Shinzo; Ueno, Seiichi; Nagasako, Isamu; and Sando, Shigeru, Re. 29,218.
Higo, Yoshiki, Re. 29,217.

Perez-Albuerne, Evelio A., to Eastman Kodak Company. Synthesis of chalcogenated polyacenes. Re. 29,210, Cl. 260-327.00B.

Population Research Incorporated: *See*—
Bolduc, Lee R.; and Dickhudt, Eugene A., Re. 29,207.

Precision Screen Machines Inc.: *See*—
Jaffa, David, Re. 29,206.

Raytheon Company: *See*—
Colombo, Sergio; Carugati, Vitaliano; Ferramola, Gianni; and Ferrari, Sergio, Re. 29,216.

Rice, Donald Wesley: *See*—
Carney, Adam Carroll; Cichetti, Michael Peter, Jr.; Kneuer, Joseph George; and Rice, Donald Wesley, Re. 29,215.

Sando, Shigeru: *See*—
Anazawa, Shinzo; Ueno, Seiichi; Nagasako, Isamu; and Sando, Shigeru, Re. 29,218.

Sayles, Donald A. Method and apparatus for continuously sensing the condition of a gas stream. Re. 29,209, Cl. 204-1.00T.

Schenectady Chemicals, Inc.: *See*—
Zalewski, Edmund J.; Simonian, John L.; and Keating, John T., Re. 29,213.

Schultz, Robert L. Preassembled electrical wiring apparatus and method of installation thereof. Re. 29,214, Cl. 174-72.00R.

Simonian, John L.: *See*—
Zalewski, Edmund J.; Simonian, John L.; and Keating, John T., Re. 29,213.

SWS Silicones Corporation: *See*—
Lewis, Richard Newton, Re. 29,211.

Ueno, Seiichi: *See*—
Anazawa, Shinzo; Ueno, Seiichi; Nagasako, Isamu; and Sando, Shigeru, Re. 29,218.

Zalewski, Edmund J.; Simonian, John L.; and Keating, John T., to Schenectady Chemicals, Inc. Wire enamel based on amide-imide hydantoin polymers. Re. 29,213, Cl. 428-458.000.

LIST OF PLANT PATENTEES

Aldrich, Susan A., to Stark Bro's Nurseries & Orchards Co. Plum tree. 4,053, 5-10-77, Cl. 38.000.

Conard-Pyle Company, The: *See*—
Zwemstra, Jelle J., 4,049.

Duffett, William E.: *See*—
Jessel, Walter H., Jr.; and Duffett, William E., 4,052.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,052, 5-10-77, Cl. 82.000.

Kaplan, Saul L. Apple tree. 4,050, 5-10-77, Cl. 34.000.

Kim, Heeyoung. *Scindapsus aureus* marble queen Heeyoung Kim. 4,054, 5-10-77, Cl. 88.000.

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214	4,022,048
234	4,022,049
379	4,022,050
410	4,022,051
429	4,022,052

CLASS 73

12	4,022,053
23	4,022,054
67.7	4,022,055
78	4,022,056
99	4,022,057
194 A	4,022,058
198	4,022,059
228	4,022,061
325	4,022,062
343 B	4,022,060
362 AR	4,022,063
382 R	4,022,064
422 GC	4,022,065
422 R	4,022,066
423 A	4,022,067

CLASS 74

54	4,022,068
126	4,022,069
231 P	4,022,070
237	4,022,071
243 R	4,022,072
410	4,022,073
421 A	4,022,074
437	4,022,075
441	4,022,076
473 R	4,022,077
475	4,022,078
476	4,022,079
481	4,022,080
512	4,022,081
570	4,022,082
665 B	4,022,083
711	4,022,084

CLASS 75

12	4,022,612
53	4,022,613
63	4,022,614
125	4,022,586
130 R	4,022,615
171	4,022,587

CLASS 81

116	4,022,086

CLASS 82

58	4,022,085

CLASS 83

27	4,022,087
34	4,022,088
124	4,022,089
162	4,022,090
175	4,022,091
306	4,022,092
355	4,022,093
409	4,022,094
455	4,022,095
617	4,022,096

CLASS 84

1.03	4,022,097
	4,022,098

CLASS 85

1 P	4,022,099
83	4,022,100
85	4,022,101

CLASS 89

6.5	4,022,102
14 SB	4,022,103
26	4,022,104
149	4,022,105

CLASS 90

12 R	4,022,106
13.05	4,022,107

CLASS 91

276	4,022,108
356	4,022,109
371	4,022,110
372	4,022,111
376 R	4,022,112
443	4,022,113

CLASS 92

98 R	4,022,114

CLASS 93

49 R	4,022,115
51 M	4,022,116

CLASS 96

20	4,022,616
27 H	4,022,618
29 D	4,022,617
33	4,022,619
56.2	4,022,620
66.3	4,022,621
67	4,022,622
114	4,022,623

CLASS 98

42 R	4,022,117
115 K	4,022,118

CLASS 99

275	4,022,119

CLASS 100

5	4,022,120
29	4,022,121
158 R	4,022,122
229 R	4,022,123

CLASS 101

36	4,022,124
148	4,022,125
269	4,022,126
327	4,022,127
407 R	Re.29,206

CLASS 102

19.2	4,022,128
49.5	4,022,129
56 R	4,022,130
70.2 P	4,022,132
70.2 R	4,022,131

CLASS 105

157 R	4,022,133
473	4,022,134

CLASS 106

2	4,022,624
3	4,022,625
15 FF	4,022,626
39.6	4,022,627
52	4,022,628
100	4,022,629
103	4,022,630
168	4,022,631
193 J	4,022,632
208	4,022,633
218	4,022,634
280	4,022,635
300	4,022,636

CLASS 108

51.3	4,022,135
108	4,022,136

CLASS 109

44	4,022,137

CLASS 112

146	4,022,138
150	4,022,139
199	4,022,140

CLASS 113

58	4,022,141

CLASS 114

42	4,022,142
104	4,022,144
153	4,022,145
271	4,022,143

CLASS 115

76	4,022,146

CLASS 116

67 R	4,022,147
106	4,022,148
114.5	4,022,149
129 T	4,022,150

CLASS 118

33	4,022,151
49.5	4,022,152
68	4,022,153
261	4,022,154
423	4,022,155
504	4,022,156
658	4,022,157

CLASS 119

14.14	4,022,158
19	4,022,159
51 R	4,022,160
96	4,022,161

CLASS 122

182 T	4,022,162
225 R	4,022,163

CLASS 123

1 R	4,022,164
32 G	4,022,165
32 JV	4,022,166
43 A	4,022,168
43 AA	4,022,167
117 A	4,022,169
117 R	4,022,170
119 EC	4,022,171
122 AC	4,022,172
122 E	4,022,173
139 E	4,022,174
140 MC	4,022,175
141	4,022,176
148 CB	4,022,177
190 E	4,022,178
198 D	4,022,179
198 DC	4,022,180

CLASS 124

35 A	4,022,181

CLASS 125

13 R	4,022,182

CLASS 126

200	4,022,183
271	4,021,895
	4,022,184
	4,022,185
	4,022,186
	4,022,187
	4,022,188

CLASS 127

46 A	4,022,637

CLASS 128

1 R	4,022,189
2 A	4,022,190
2 B	4,022,191
2.06 F	4,022,192
2.08	4,022,193
4	4,022,194
24.2	4,022,195
79	4,022,196

101 4,022,197
130 4,022,198
132 R 4,022,199
141 R 4,022,200
145 A 4,022,201
145.8 4,022,202
156 4,022,203
163 4,022,204
214 R 4,022,205
216 4,022,206
218 C 4,022,207
235 Re.29,207
239 4,022,208
278 4,022,209
284 4,022,210
287 4,022,211
288 4,022,212
295 4,022,213
303.1 4,022,214
4,022,215
349 B 4,022,216
4,022,217
350 R 4,022,218
351 4,022,219

CLASS 130

30 R 4,022,220

CLASS 131

10.5 4,022,221
4,022,222
10.9 4,022,223
262 R 4,022,224

CLASS 132

31 R 4,022,225
39 4,022,226
53 4,022,227
75 4,022,228
92 R 4,022,229

CLASS 134

1 4,022,638
2 4,022,639
73 4,022,230
133 4,022,231

CLASS 135

6 4,022,232
20 M 4,022,233

CLASS 137

7 4,022,234
38 4,022,235
70 4,022,236
85 4,022,237
98 4,022,238
119 4,022,239
209 4,022,240
240 4,022,241
270 4,022,242
360 4,022,243
517 4,022,244
559 4,022,245
601 4,022,246
630.13 4,022,247

CLASS 138

141 4,022,248
178 4,022,249

CLASS 139

18 4,022,250
59 4,022,251
91 4,022,252
446 4,022,253
453 4,022,254

CLASS 141

1 4,022,255
4,022,256
98 4,022,257
330 4,022,258

CLASS 144

34 E 4,022,259
134 D 4,022,260

CLASS 148

37 4,022,640

CLASS 150

28 A 4,022,261

CLASS 151

7 4,022,262

CLASS 156

72 4,022,642
78 4,022,643
79 4,022,644
91 Re.29,208
120 4,022,645
164 4,022,646
182 4,022,647
273 4,022,648
309 4,022,649
498 4,022,650
577 4,022,651
605 4,022,652
650 4,022,641

CLASS 160

92 4,022,263

CLASS 162

16 4,022,653
19 4,022,654

CLASS 164

52 4,022,264
73 4,022,265
250 4,022,266
260 4,022,267
282 4,022,268
314 4,022,269

CLASS 165

5 4,022,270
12 4,022,271
51 4,022,272

CLASS 166

65 R 4,022,273
118 4,022,274
249 4,022,275
250 4,022,276
267 4,022,277
269 4,022,278
271 4,022,279
272 4,022,280
315 4,022,281

CLASS 172

1 4,022,282
15 4,022,283

CLASS 173

2 4,022,284

CLASS 174

65 SS 4,022,966
72 R Re.29,214
156 4,022,967

CLASS 175

65 4,022,285
313 4,022,286
393 4,022,287

CLASS 176

38 4,022,655
4,022,656
40 4,022,657
4,022,658
60 4,022,659
67 4,022,660
79 4,022,661
82 4,022,662
4,022,663

CLASS 177

229 4,022,288
247 4,022,289

CLASS 178

18 4,022,969
19 4,022,971
69.1 4,022,973

CLASS 179

1 H 4,022,976
1 N 4,022,975
1.5 M 4,022,974
2 AM 4,022,977
8 A 4,022,978
15 AT 4,022,982
15 BA Re.29,215
15 BF 4,022,979
18 B 4,022,983
18 BC 4,022,981
4,022,991
18 HB 4,022,980
91 R 4,022,984
99 4,022,985
100.3 B 4,022,986
175 4,022,987
175.2 C 4,022,989
175.3 F 4,022,990
175.31 R 4,022,988
189 D 4,022,992

CLASS 180

14 R 4,022,290

CLASS 181

53 4,022,291

CLASS 182

33 4,022,292
150 4,022,293

CLASS 184

6.9 4,022,294
15 R 4,022,295

CLASS 187

29 R 4,022,296

CLASS 188

26 4,022,297
71.6 4,022,298
71.9 4,022,299
72.1 4,022,300
4,022,301
73.1 4,022,302
73.3 4,022,303
203 4,022,304
332 4,022,305

CLASS 192

3 TR 4,022,306
12 D 4,022,307
21 4,022,308
48.5 4,022,309
107 C 4,022,310

CLASS 195

2 4,022,664
27 4,022,665
62 4,022,666
103.5 R 4,022,667

CLASS 197

1 R 4,022,311
15 4,022,312
167 4,022,313

CLASS 198

413 4,022,314
471 4,022,315
860 4,022,316

CLASS 200

5 A 4,022,993
16 C 4,022,994
44 4,022,995
61.43 4,022,996
61.45 R 4,022,997
4,022,998
67 G 4,022,999
83 C 4,023,000
157 4,023,001
159 R 4,023,002
308 4,023,003

CLASS 201

5 4,022,668

CLASS 202

160 4,022,669

CLASS 204

1 T Re.29,209
38 A 4,022,670
42 4,022,671
55 R 4,022,676
59 R 4,022,672
73 R 4,022,673
159.22 4,022,674
188 4,022,675
263 4,022,677
273 4,022,678
286 4,022,679

CLASS 206

205 4,022,317
223 4,022,318
233 4,022,319
310 4,022,320
386 4,022,321
387 4,022,322
419 4,022,323
439 4,022,324

CLASS 208

8 4,022,680
57 4,022,681
89 4,022,682
92 4,022,683
111 4,022,684

CLASS 209

157 4,022,685
166 4,022,686

CLASS 210

65 4,022,687
71 4,022,688
151 4,022,689
169 4,022,690
202 4,022,691
321 B 4,022,692
345 4,022,693
350 4,022,694
486 4,022,695
520 4,022,696
530 4,022,697

CLASS 211

11 4,022,325
41 4,022,326
74 4,022,327
149 4,022,328

CLASS 213

67 R 4,022,329

CLASS 214

1 H 4,022,330
1 R 4,022,331
6 B 4,022,333
6 C 4,022,332
6 P 4,022,334
17 CB 4,022,335
44 R 4,022,336
75 R 4,022,337
89 4,022,338
140 4,022,339
307 4,022,340
330 4,022,341
392 4,022,342

CLASS 219

10.55 B 4,023,004
121 LM 4,023,005
121 P 4,023,006
388 4,023,007
522 4,023,008

CLASS 220

3 4,022,343
4 A 4,022,344
71 4,022,345
273 4,022,346

CLASS 222

1 4,022,347
3 4,022,348
54 4,022,349
79 4,022,350
145 4,022,351
153 4,022,352
276 4,022,353
321 4,022,354
327 4,022,355
485 4,022,464
509 4,022,356
537 4,022,357
607 4,022,358
629 4,022,359

CLASS 223

96 4,022,360

CLASS 224

2 B 4,022,361
42.1 F 4,022,362
45 AA 4,022,363

CLASS 225

100 4,022,364

CLASS 226

81 4,022,365
91 4,022,366
4,022,367
118 4,022,368
189 4,022,369

CLASS 228

5.1 4,022,370
122 4,022,584
223 4,022,371

CLASS 229

40 4,022,372
51 AS 4,022,373
68 R 4,022,374

CLASS 233

1 R 4,022,375

CLASS 235

55 C 4,023,009
61.11 E 4,023,010
61.11 R 4,023,011
61.7 B 4,023,012
4,023,013
4,023,014
92 PD 4,023,015
134 4,022,376
150.2 4,023,016
150.24 4,023,017
150.27 4,023,018
150.51 4,023,019
151.2 4,023,020
151.33 4,023,021
151.35 4,023,022
152 4,023,023
4,023,024
4,023,025
4,023,026
4,023,027
156 4,023,028

CLASS 236

34.5 4,022,377

CLASS 237

12.3 A 4,022,378

CLASS 239

8 4,022,379
68 4,022,380
126 4,022,381
287 4,022,382
419.3 4,022,383
542 4,022,384
592 4,022,385
657 4,022,386

CLASS 240

4.2 4,023,029
8.2 4,023,030
37 4,023,031
58 4,023,032

CLASS 241

130 4,022,387
246 4,022,388

CLASS 242

18 DD 4,022,390
18 PW 4,022,389
25 R 4,022,391
41 4,022,392
55.17 4,022,396
55.19 A 4,022,397
55.2 4,022,393
96 4,022,398
129.6 4,022,394
163 4,022,399
192 4,022,400
198 4,022,395
4,022,401
199 4,022,402

CLASS 244

46 4,022,403
118 P 4,022,404
123 4,022,405
152 4,022,406

CLASS 246

34 R 4,022,407
4,022,408
218 4,022,409

CLASS 248

2 4,022,410
13 4,022,412
23 4,022,413
150 4,022,414
298 4,022,415
318 4,022,416
400 4,022,411
440 4,022,417
460 4,022,418

CLASS 249

54 4,022,419
194 4,022,420

CLASS 250

201 4,023,033
227 4,023,034
237 R 4,023,036
239 4,023,035
313 4,023,037
320 Re.29,216
423 P 4,023,038
486 4,023,039
566 4,023,040

CLASS 251

74 4,022,421
118 4,022,422
127 4,022,423
214 4,022,424
324 4,022,425
340 4,022,426
343 4,022,427

CLASS 252

8.1 4,022,698
8.55 D 4,022,699
51.5 A 4,022,700
62.54 4,022,701
89 R 4,022,702
100 4,022,703
135 4,022,704
188.3 R 4,022,705
299 4,022,706
301.1 W 4,022,708
301.35 4,022,709
301.6 P 4,022,707
313 R 4,022,710
389 R 4,022,711
4,022,712
4,022,713
455 Z 4,022,714
463 4,022,715
520 4,022,716

CLASS 254

89 R 4,022,428
95 4,022,429
106 4,022,430
134.3 PA 4,022,431
185 B 4,022,432
188 4,022,433

CLASS 256

1 4,022,434
4,022,435
24 4,022,436
26 4,022,437

CLASS 259

107 4,022,438
165 4,022,439
192 4,022,440

CLASS 260

2 H 4,022,717
2.5 AC 4,022,720
4,022,721
2.5 AH 4,022,722
2.5 AM 4,022,718
2.5 N 4,022,719
4 AR 4,022,723
16 4,022,724
18 R 4,022,725
21 4,022,726
4,022,727
27 R 4,022,728
28 P 4,022,738
28.5 B 4,022,729
28.5 C 4,022,739
28.5 R 4,022,730
29.2 E 4,022,740
29.4 UA 4,022,737
4,022,741
29.6 E 4,022,731
4,022,736
29.6 F 4,022,742
29.6 MN 4,022,734
29.6 NR 4,022,732
29.6 R 4,022,744
29.6 T 4,022,743
29.7 UP 4,022,733
29.7 W 4,022,735
30.2 4,022,745
4,022,746
37 SB 4,022,747
40 R 4,022,748
42.18 4,022,749
45.75 B 4,022,752
45.75 C 4,022,751
45.75 H 4,022,750
46.5 R 4,022,753
47 UA 4,022,754
59 R 4,022,755
78 R 4,022,756
112 B 4,022,758
112.5 LH 4,022,759
4,022,760
4,022,761
158 4,022,762
186 4,022,763
239 B 4,022,764
239.3 B 4,022,766
239.3 D 4,022,767
239.3 T 4,022,765
239.5 4,022,768
239.55 R 4,022,769
240 C 4,022,772
240 D 4,022,771
240 G 4,022,770
243 C 4,022,773
243 D 4,022,774
243 R 4,022,775
247.2 A 4,022,776
250 BC 4,022,778
4,022,779
250 Q 4,022,777
256.4 Q 4,022,780
268 BC 4,022,781
268 H 4,022,783
268 TR 4,022,782
288 R 4,022,784
290 P 4,022,785
293.54 4,022,789
293.55 4,022,790
293.56 4,022,788
293.62 4,022,791
293.72 4,022,786
293.81 4,022,787
293.83 4,022,792
294.8 F 4,022,793
295 R 4,022,794
296 D 4,022,795
301 4,022,796
302 R 4,022,797
308 B 4,022,799
309.6 4,022,798
310 R 4,022,800
4,022,801
319.1 4,022,802
327 B Re.29,210
343.6 4,022,803
345.1 4,022,804
346.2 M 4,022,805
397.1 4,022,806

410 4,022,807
410.6 4,022,808
448 R 4,022,809
448.8 R Re.29,211
449.6 M 4,022,810
453 RX 4,022,811
456 P 4,022,812
463 4,022,813
4,022,814
465.5 A 4,022,815
465.7 4,022,816
471 A 4,022,818
473 S 4,022,819
475 B 4,022,820
475 R 4,022,817
514 D 4,022,821
526 N 4,022,822
531 R 4,022,823
539 A 4,022,824
543 A 4,022,825
543 P 4,022,826
544 B 4,022,827
545 R 4,022,828
558 S 4,022,829
559 R 4,022,830
562 N 4,022,832
562 R 4,022,831
563 R 4,022,833
564 B 4,022,834
566 F 4,022,835
570.8 R 4,022,836
591 4,022,838
597 R 4,022,837
610 B 4,022,841
613 A 4,022,842
621 R 4,022,843
645 4,022,844
666 M 4,022,845
677 A 4,022,839
683 D 4,022,846
683.3 4,022,840
683.68 4,022,847
846 4,022,848
876 R 4,022,849
897 B 4,022,850
932 4,022,757
950 4,022,851
970 4,022,852

CLASS 261

23 R 4,022,853
122 4,022,854

CLASS 264

1 4,022,855
26 4,022,856
42 4,022,857
51 4,022,858
69 4,022,859
95 4,022,860
116 4,022,861
210 R 4,022,863
257 4,022,864
271 4,022,862

CLASS 266

48 4,022,441
75 4,022,442
148 4,022,443
216 4,022,444
224 4,022,445
252 4,022,446
266 4,022,447

CLASS 267

8 R 4,022,448
48 4,022,449
73 4,022,450
116 4,022,451
140 4,022,452

CLASS 269

71 4,022,453
100 4,022,454

CLASS 270

54 4,022,455
65 4,022,456
86 4,022,457

CLASS 271

173 4,022,458
223 4,022,459
258 4,022,460

CLASS 272

22 4,022,461
74 4,022,462
136 4,022,463

CLASS 273

1 B 4,022,466
1 E 4,022,465
29 A 4,022,467
49 4,022,468
61 C 4,022,469
81.5 4,022,470
96 D 4,022,477
102.4 4,022,471
105 R 4,022,472
130 R 4,022,473
138 A 4,022,474
183 B 4,022,475
185 C 4,022,476

CLASS 274

10 S 4,022,478

CLASS 277

53 4,022,479
95 4,022,480
96.1 4,022,481

CLASS 280

11.37 E 4,022,482
203 4,022,483
284 4,022,484
287 4,022,485
289 A 4,022,488
289 L 4,022,486
289 S 4,022,487
491 E 4,022,489
500 4,022,490
618 4,022,491
4,022,492
633 4,022,493
723 4,022,494
750 4,022,495

CLASS 285

3 4,022,496
4 4,022,497
16 4,022,498
328 4,022,499
332 4,022,500

CLASS 289

11 4,022,501

CLASS 290

53 4,023,041

CLASS 292

264 4,022,503
340 4,022,504

CLASS 293

71 R 4,022,505

CLASS 294

1 A 4,022,506
74 4,022,507

CLASS 296

1 S 4,022,508
28 C 4,022,509

CLASS 297

153 4,022,510
414 4,022,502

CLASS 299

2 4,022,511

CLASS 302

26 4,022,512

CLASS 303

93 4,022,513
115 4,022,514

CLASS 307

10 AT 4,023,042
38 4,023,043
116 4,023,044
119 4,023,045
246 4,023,048
252 C 4,023,049
264 4,023,050
288 Re.29,217
305 4,023,051
308 4,023,052
320 4,023,053
360 4,023,046
363 4,023,047

CLASS 308

152 4,022,515
199 4,022,516

CLASS 310

8.3 4,023,054
9.1 4,023,055
15 4,023,056
154 4,023,057

CLASS 312

257 R 4,022,517

CLASS 313

139 4,023,058
184 4,023,059
273 4,023,060
349 4,023,061
400 4,023,063
4,023,064
498 4,023,062

CLASS 315

111.2 4,023,065
209 R 4,023,066
4,023,067
241 P 4,023,068
397 4,023,069

CLASS 318

85 4,023,080
109 4,023,081
138 4,023,082
227 4,023,083
603 4,023,084
608 4,023,085

CLASS 321

11 4,023,086
19 4,023,087

CLASS 322

2 R 4,023,088
28 4,023,089

CLASS 323

47 4,023,090

CLASS 324

34 R 4,023,091
4,023,092
43 R 4,023,093
57 R 4,023,094
4,023,095
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D6—	24	244,237	D8—	26	244,252		111	244,266		96	244,299		22	244,287	D27—	14	244,302
	29	244,238		50	244,253		156	244,267	D15—	64	244,274		27	244,288	D28—	89	244,318
	75	244,239		351	244,254		157	244,268		90	244,275			244,289	D34—	5 CT	244,306
	76	244,240		355	244,255		163	244,269		123	244,276	D23—	2	244,290		5 GC	244,303
	85	244,241	D9—	18	244,256		187	244,270		126	244,277		48	244,291		5 GP	244,305
	172	244,242		31	244,257			244,271		138	244,278		55	244,292		5 L	244,304
	184	244,243		190	244,258		205	244,272		140	244,279		139	244,293		15 GG	244,307
	247	244,244		224	244,259		211	244,273	D16—	32	244,280		153	244,294		15 PP	244,308
D7—	1	244,245		275	244,260	D13—	28	244,297		65	244,281	D24—	1.1	244,316	D47—	6 E	244,309
	17	244,246	D10—	15	244,261			244,298			244,282		7	244,317	D48—	4 B	244,310
	20	244,247		126	244,262	D14—	5	244,313			244,283		38	244,314		32 D	244,311
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		244,277			244,302	25	: 244,286			244,247	37 : 244,310		244,305
		244,290			244,303		244,307			244,252	39 : 244,259	45	: 244,292
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8	:	244,271			244,268	29	: 244,244			244,295	41 : 244,238		244,301

PLANT PATENTS

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Juanita M. Kreps, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*